CLUSTER IN-FILL CONCEPT

with funding provided by

Alberta
DEPARTMENT OF HOUSING
Innovative Housing Grants Program

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CLUSTER IN-FILL CONCEPT

Community Planning Consultants Ltd.
Peter Pratt Architect Ltd.

Introduction

This research study introduces an affordable housing alternative that conforms to the higher density demands of the in-fill market but is designed to preserve, enhance and protect the family living environment. The individual housing units are planned around a common vehicle access and parking system, with shared play areas. The units are spacially arranged in a form that intensifies the role of associated private open spaces.

Traditional In-fill Designs

The research was carried out in three phases.
Phase I reviewed existing examples of in-fill housing in Calgary as well as elsewhere and developed a short list of advantages and disadvantages. It compared servicing and land-use zoning requirements, legal ownership issues, costs, servicing and affordability.

Phase II investigated the range of in-fill housing options available on three 50' x 120' lots, including single family housing, narrow lot housing, duplex, townhouse and cluster concepts. The phase concluded with a comparative examination of three specific alternatives.

An Alternative Approach

Phase III presented the cluster in-fill concept which achieves a density of 18 units per acre while maintaining a single family character. A detailed design was developed to demonstrate the social and economic benefits which may be achievable by using this innovative housing alternative.

Copies of this report are available from Alberta Department of Housing, Innovative Housing Grants Program, 4th Floor, 10050 - 112 Street, Edmonton, Alberta T5K 2J1 (403/427-8150). Please refer to the order number shown in box at right, when requesting copies of completed reports.

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Report: 50 Pages

Conclusions

- The Cluster In-Fill Concept capitalizes on cost benefits generally available only through duplex and row housing while retaining a single family character.
- It appears to penetrate the affordability threshold in the infill context and could satisfy a previously untouched market segment.
- Inefficient and costly circulation space is minimized while providing a more efficient and pleasing relationship of the interior to the different types of open space around the unit
- Security is enhanced by virtue of the cluster design. Small, peaceful outdoor spaces free from vehicular traffic are provided .
- It is felt that the demand for benefits provided by the cluster in-fill concept will come from the "family oriented" sector of the market.

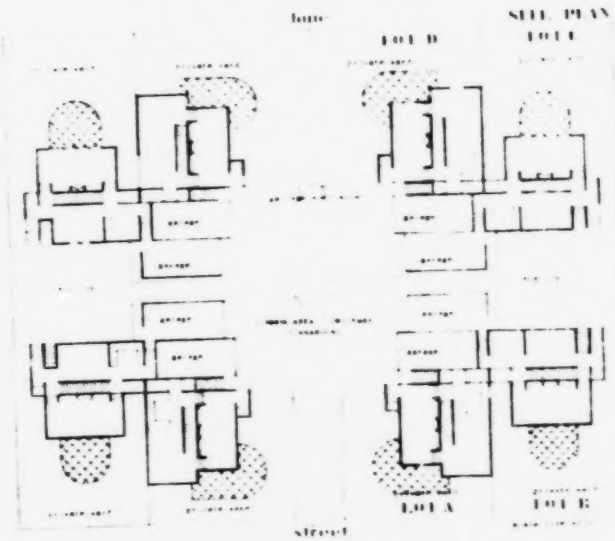

Figure 1. Cluster In-fill Concept

CLUSTER IN-FILL CONCEPT

September 1983

Prepared By:

COMMUNITY PLANNING CONSULTANTS LTD
PETER PRATT ARCHITECTS LTD

The views and conclusions expressed and the recommendations made in this report are entirely those of the authors and should not be construed as expressing the opinions of the Alberta Department of Housing.

With funding provided by
Alberta Department of Housing

ISBN 0-88654-018-6

FOREWORD

This study was made possible with funding provided by the Innovative Housing Grants Program of the Alberta Department of Housing. Originally conceived in 1978, the Program is intended to encourage, sponsor, and assist research and development in the fields of housing, site and subdivision design, energy conservation, site servicing and urban development. Generally, the aims of research funded by the Innovative Housing Grants Program are to reduce housing costs, increase the supply of appropriate housing or improve the utility or performance of dwelling units or subdivisions.

The main purpose of funding these studies is to examine the current issues in the field of housing and to develop innovations which offer improvements. Comments and suggestions regarding the information contained in these reports are welcome.

Innovative ideas come from a wide variety of applicants such as builders, developers, consulting firms, industry associations, municipal governments, educational institutions, non-profit groups and individuals. As the type of project and level of resources vary from applicant to applicant, the resulting documents are also varied.

Where possible the Department encourages the dissemination of study results under a standard cover and in a uniform format. This study,
Cluster In-Fill Concept, was completed in October 1982 and subsequently released under a different cover.

Please send comments and suggestions or requests for further information to:

Innovative Housing Grants Program
Fourth Floor
10050 - 112 Street
Edmonton, Alberta
T5K 2J1

Alberta Department of Housing September 1983

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September 15, 1982

Office of the Deputy Minister
Alberta Housing and Public Works
3rd Floor, 10050 - 112 Street
Edmonton, Alberta
T5K 1L9

Attn: Mr. M.D. Rasmussen, Deputy Minister of Housing

Dear Sir:

RE: CLUSTER IN-FILL CONCEPT - #8112222

We take pleasure in transmitting herewith our final report concluding the 3 Phased research program we commenced in late March of this year.

The work undertaken brought us in close contact with a wide spectrum of individuals and organizations all concerned with housing issues. As such, it has been a learning experience that would not have been possible to share without the support and encouragement of the Innovative Housing Grants Program.

Yours truly,

Robert B. Furukawa

Robert B. Furukawa
Community Planning Consultants Ltd.

PETER PRATT ARCHITECT LTD.

300 - 838 11 TH. AVE. SOUTH WEST CALGARY ALBERTA CANADA T2R 0G6 TELEPHONE 403 - 237 - 7662

September 15, 1982

Office of the Deputy Minister
Alberta Housing and Public Works
3rd Floor, 10050 - 112 Street
Edmonton, Alberta
T5K 1L9

Attn: Mr. M.D. Rasmussen, Deputy Minister of Housing

Dear Sir:

RE: CLUSTER IN-FILL CONCEPT - # 8112222

It is a source of great pride and gratitude to submit herewith our work to Alberta Housing and Public Works, Innovative Housing Grants Program.

We have confidence that the contents and conclusions outlined in this document reflect the keen interest and commitment we all share in finding solutions to the vital and contemporary questions of affordable family housing.

We also submit our research findings with new insights gained, and forsee potential use of a modular and prefabricated form of housing as a means of addressing further questions and issues of affordability.

Yours truly,

Peter Pratt

Peter Pratt
Peter Pratt Architect Ltd.

ACKNOWLEDGEMENTS

This work would not have been possible without the concerned interest and support of the Alberta Housing and Public Works Department through their Innovative Housing Grants Program. Throughout the conduct of this study we received the co-operation of the A.H.P.W. Planning and Policy Division. The authors wish to record their thanks to the Division Director, Mr. Linden Holman for the interest taken in our work through his understanding of our research aims and objectives. Special thanks to Mr. Robert J. Sloat, Manager of Research and Development for his important comments and words of encouragement and to Ms. Judy A. Ferguson, Administrator for her kind co-operation.

During the conduct and preparation of this research effort a considerable number of people contributed towards its success. The authors wish to record their thanks to all those who gave freely of their time and advice: the City of Calgary Planning and Engineering Departments; Calgary Division of H.U.D.A.C., Multiple Housing Division; Mr. William Plante, General Manager of Britannia Homes; the Calgary Real Estate Board Co-operative; Mr. John Yates, Quantity Surveyor; Mr. Wilf Morgan, Calgary Mayor's Office; Mr. Rudy Miralda, Architect; Mr. Ron Jones, P. Eng.; Mr. Jack Pascoe, P. Eng.; Mr. Greig Farstad, P. Eng.; Mr. Sam Graham, Branch Manager, Housing, Calgary Branch, Wimpey Western Limited.

The advice and critique received from Professor R.D. Gillmor, Faculty of Environmental Design, University of Calgary; and Dr. S. Goldenberg, Associate Professor of Sociology, University of Calgary is greatfully recorded.

The authors wish to express special thanks to Mr. Sandy Cameron of Goodfellow Mackenzie who provided legal advice on real estate issues in the work. Also Mr. Rudy Wouts, P. Eng., Mr. Fernand Theunissen, P. Eng. and Mr. Peter Miller, Surveyor, all of McEllhaney Surveying and Engineering Ltd. who assisted in the study through their work on engineering design and legal survey issues.

All of this undertaking would have been considerably delayed and more difficult to complete without the tireless effort of Ms. Mona Kawano. Her assistance in research, graphics, typing and editorial support provided the authors with much needed help and we are indebted to her for the contribution she has made.

While many individuals gave freely of their advice and contributed towards this work, the final results and conclusions found within the study are the responsibility of the authors.

INTRODUCTION

The City of Calgary has experienced one of the fastest rates of growth in comparison to other Canadian urban centres during the past 5 years. This rate of growth in a time period of rising mortgage interest rates, high land and building costs has placed unprecedented pressure upon the affordability of housing in Calgary.

Compared to other older cities, Calgary is comparatively young with a housing stock that is substantially comprised of sprawling subdivisions of single family homes. The City has a distinct lack of an abundance of quality older neighbourhoods which could provide the potential of desireable housing alternatives. These conditions, together with the entrenchment of restrictive municipal building and development guidelines, manifest underlying reasons for some of Calgary's housing problems.

This study was undertaken in an attempt to research and investigate those Calgary experiences and to determine possible solutions. It focusses upon in-fill housing opportunities to accommodate the growing range of market needs for single family housing resulting from the mixed influx of people to Alberta and the City of Calgary. The aim has been to provide an innovative approach to housing to meet the affordability threshold within the market arising from rapid growth.

The concept evolved is based upon a cluster housing form that is entirely single-family, however, semi-detached. The cluster concept was developed to preserve, enhance and protect family lifestyle and environment. In keeping with Calgary's historical housing market trends, the approach was conceived to substantially retain the single family character and feeling, yet through good site planning reduce the apparent density.

The cluster concept provides a more efficient use of surrounding lands with a hierarchy of different types of open spaces that better relate the interior house design to its exterior spaces. The cluster approach was also conceived for possible adoption as an innovative concept to neighbourhood planning and development in a wider context.

This research work was undertaken on a 3 Phase program basis. Each phase was completed through the preparation of a working document which was submitted in report form to the Department, Planning & Policy Division. These working documents form an integral part of this total work as this final report attempts to summarize the findings and report on the conclusions of the research undertaken. Reference ought to be made to the working documents for any details that may be required for broader explanations.

PHASE I

PHASE I

PRELIMINARY INVESTIGATION

Innovative Concepts Reviewed

The City of Calgary has implemented a number of experimental housing projects in recent years. Residential projects considered innovative have been planned, approved and constructed within the City dating back to 1969.

The primary objective of past innovative projects has been essentially to:

a) Increase lot yield per acre of development for family oriented housing.
b) Attain cost savings and capital servicing cost savings on lots.
c) Attempt to improve upon design (subdivision and the built-form) to create an overall 'better product'.
d) To try and create affordable housing.

Past projects considered innovative that were developed in Calgary and reviewed for this study were:

Single Family Projects

- Tempo Village (1971)
- Dover West (1973)
- Varsity Village

Multiple Family and Mixed Projects

- Forest Heights (1972)
- Lynnwood (1972)
- Dover Meadows
- Penbrooke (1970)
- Whitehorn
- Erin Woods

Comprehensive Development Projects

- Ranchlands (1975)

Other Development Projects Reviewed

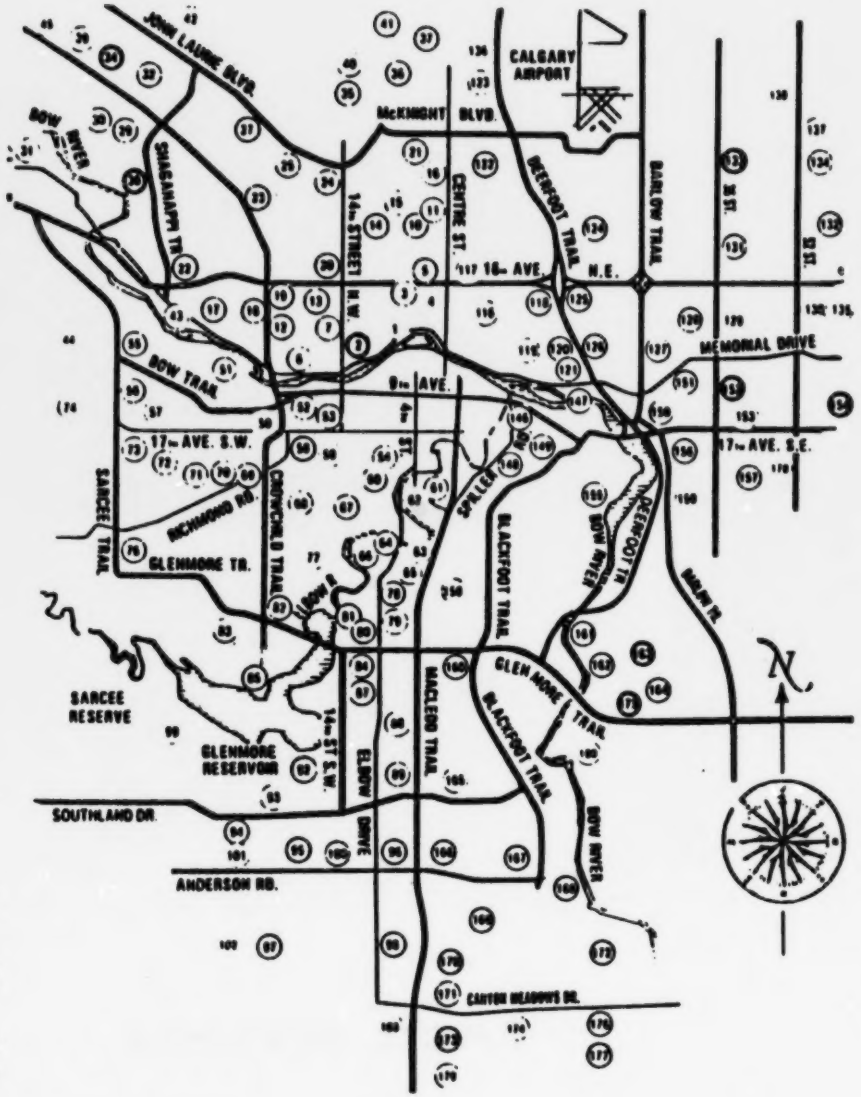
- Transcona (Winnipeg, Manitoba)
- Mill Woods (Edmonton, Alberta)
- X-A-GON Concept (Edmonton, Alberta)
- Mililani (Oahu, Hawaii)
- Lake Forest (Irvine, California)
- Village Homes (Davis, California)

The list of past innovative housing developments have evolved the following experiences. Positive results in cost savings were reported to be achieved, however the longer term effect of innovations do not appear to have been monitored and thus response from the householders providing total experience is unknown. The specific innovative concepts reviewed were:

- Laneless Subdivision: Increases net developable lands and reduces public maintenance needs for lanes. Reduces unsightly backyard/lane conditions. Requires wider street frontage for driveway and garage. Garbage pick-up and all utility services from the fronting street.

- Reduced Lot Sizes: Requires more thought to site planning and more efficiently designed smaller houses. Reduction in street frontage provides overall cost savings.

Calgary Communities



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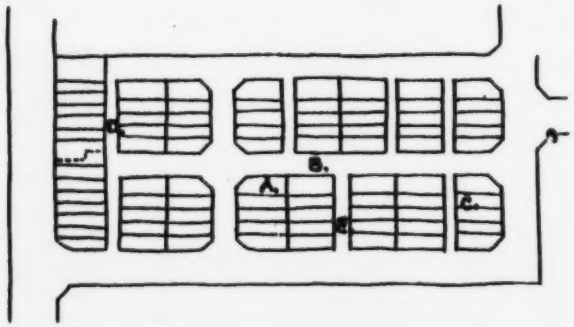
PENBROOKE



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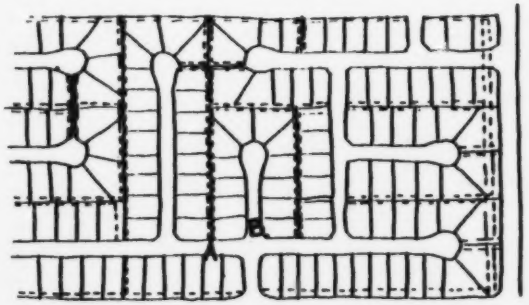

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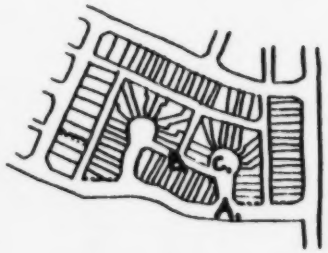
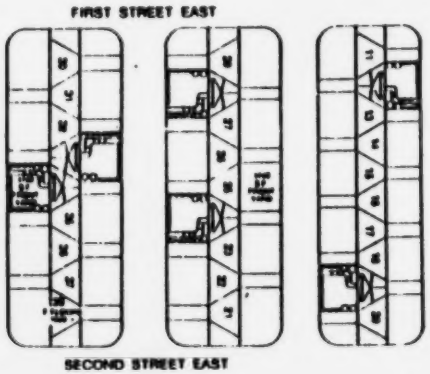


X-A-GON HOMES



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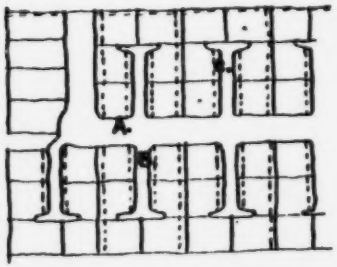
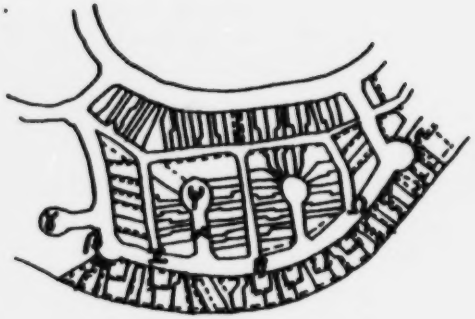


WHITEHORN

PROJECTS REVIEWED

RANCHLANDS



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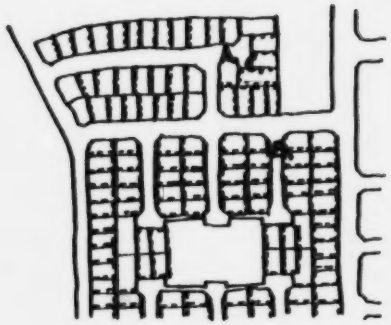

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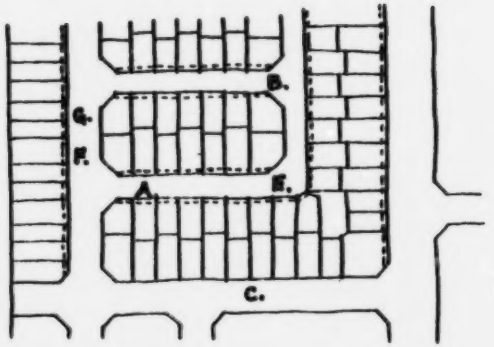

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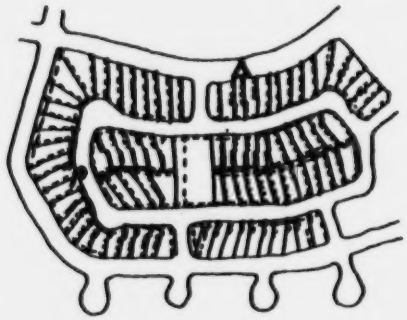
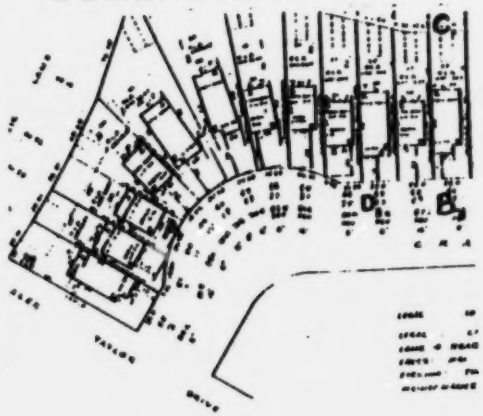


MILLANI

TRANSCONA



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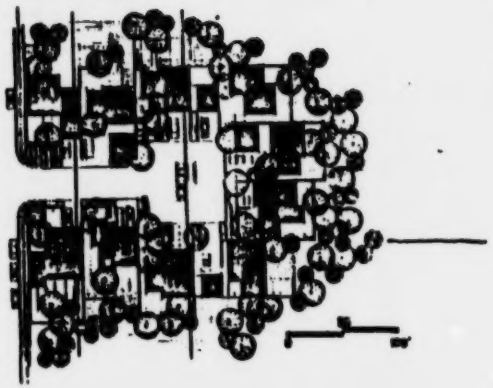

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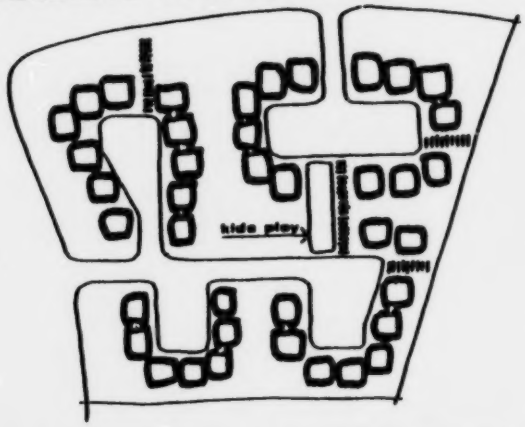

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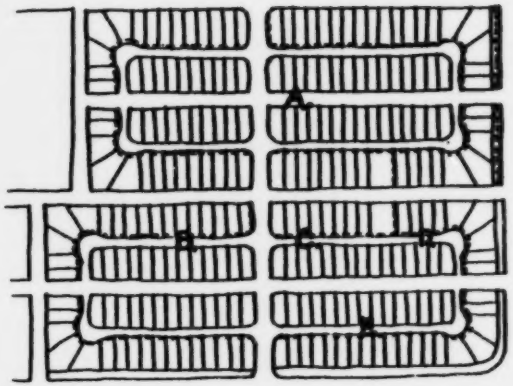

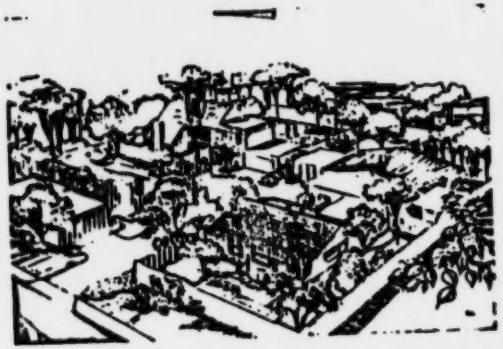

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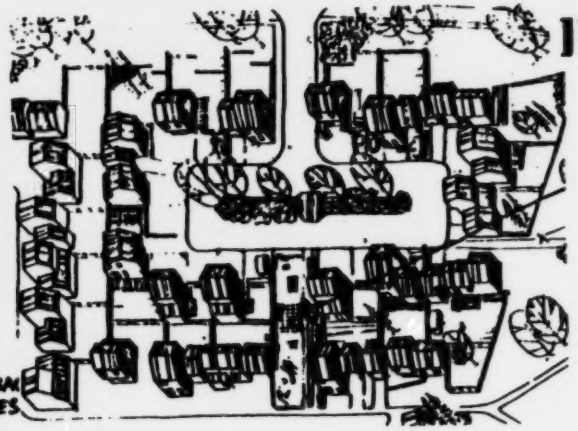

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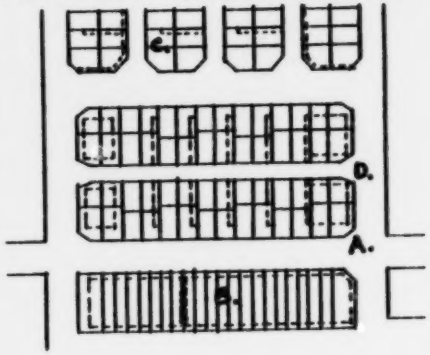


- Utility Corridor Outside the Street R/W: This concept replaces back lanes with walkways and landscaped parkways. Liveable environment is increased provided the built-form relates properly to the open space. Maintenance cost increases for parkway up-keep.

- Zero Lot Line Housing: This concept permits more efficient use of smaller lots and increases useable private yard space. It achieves higher density with feeling of open sapce for the unit (if designed properly) and provides siting flexibility for solar gain. It presents legal access requirement for maintenance and blank wall on one side that may require higher fire-rated material.

- Modified Zero Lot Line: This concept destroys the original intent of zero lot by siting the house some 4' from the lot line. This is to ensure legal access and to solve the fenestration problem.

- Flag Lotted Subdivision: This concept works best if applied together with the zero lot. It increases density through reduction of lot frontage. Average lot depth is increased and greater site planning care as well as good built-form design is needed. Garage tends to dominate views.

- Cluster Concept: Design increases average density and creates more useable open space. Tends to reduce servicing costs and overall maintenance costs. Respects environmentally sensitive lands and leads to a more imaginative use of site features. Requires greater time and care in built-form design and site planning.

- PUD (Planned Unit Development): This is actually another term for the cluster concept. Design of built-form to properly mold and fit the landscape is through carefully integrated design and site planning. (In Calgary developments of this nature are permitted under the DC Direct Control Zone).

- Narrow Lots (25') Split-Title: This is the most readily implementable method of increasing lots and reducing land costs. It increases density and has been a promotor of in-fill housing. The narrow site dictates long and narrow built-form that requires added circulation and higher costs to build.

Other cost saving innovations that have been tried are related to engineering practice. The establishment of reduced street width has been one of the major areas of cost savings evolved as a standard from the innovative experience in Calgary.

Methods of development cost reduction tried in past projects are:

- 'Dished Pavement': This method of construction eliminates the substantial costs required for curb and gutter and thus reduces storm drainage costs.

- 'Cross-Fall' Carriageway: This design concept reduces cost to curb and gutter on one side only.

- Asphalt Curbs: This is a method of reducing costs substantially. However, ongoing maintenance costs increase since

such curbs do not stand up well in the long-run to use.

- Service Connections (Single trench): This practice reduces cost through the use of single trenching. The common trench arrangement would service 2 single-family units. Access to maintain in case of problems and who pays is the major drawback.

The Calgary Land Use and Development Guidelines

The past and present processes of evolving innovative concepts or alternative housing forms requires an understanding of the existing legal parameters defined by the City Land Use and Development Guidelines.

- Existing Land Use By-law districts reviewed were: R-1, R-2, R2-A, RM-H and RM-1.

- The yard requirements for the front, side and back are the same for R-1, R-2 and R2-A. Height restriction of 10m is also the same for all 3 zones as well as for 45% maximum lot coverage. R2-A permits low density townhouse developments. RM-H is specifically for mobile home parks and subdivisions.

- The RM-1 district is designed to provide for comprehensive townhouse developments at 18 units per acre. The district calls for 40% landscaping and 2 off-street parking spaces is desireable.

- Under R-2 district, the in-fill housing policy permits the splitting of titles to create two 25' minimum frontage lots.

- Innovative housing projects that do not categorically comply with any of the above districts have been accepted and approved under a DC Direct Control District. This control method permits a fair degree of design discretion and flexibility where required and not covered under general regulations of the low-density housing district guidelines.

- Currently the City Planning Department is undertaking the study of the narrow lot (25') form of Single Family lot subdivision.

- For comprehensive residential subdivision developments the City-wide planning policy of 22 persons per acre is applicable.

Other Project Experiences Examined

Building developments based on existing Municipal Land Use regulations and Development Guidelines can result in a variety of good and bad experiences. To the ultimate end user, and therefore the general public or market, the initial basis of measure is one of appearance. Thereafter enters the question of location, cost, proximity to services etc. It would appear that while Land Use regulations and Development Guidelines provide the basic framework for spatial requirements, how well the ultimate building development takes place depends totally upon the architectural design and landscape treatment. Research into various developer experiences indicate that several methods of incorporating and implementing control measures over architectural design and landscape treatment are being used.

- Calgary / Ranchlands: The developer undertook considerable site planning and built-form studies for each area of development. Innovations were planned through this process and this established a number of alternative built-form parameters.

  These parameters formed part of a select tender package against which chosen builders/contractors were asked to respond with their designs and costs. This method provided the developer with desired architectural control at minimum cost and allowed for flexibility providing choice of variety from each select builder/contractor.

- Winnipeg / Transcona: The builder/developer recently commenced development of Transcona based on a modified zero lot line subdivision. The innovation was used to reduce frontage costs of land down to 25'. Here the developer maintained full control of the entire project by acting as both land developer and builder.

- Calgary / Erin Woods: The builder/developer is creating a low density mixed residential development. The Land Division creates and markets serviced lots to their Housing Division who then tenders contractors to build houses. The Land Division sets up covenants where applicable (fencing, drainage, parking etc.) as well as easements. They also dictate landscape treatment, setbacks and paint colour selection. Each builder contracted submits their own design plans which are reviewed by the Housing Division and architectural control is maintained in this manner.

- Edmonton / Mill Woods: An experimental project spnsored by CMHC in conjunction with the City of Edmonton. Here the sponsors outlined the project and physical requirements for project design. Interested builder/developers were invited for proposals and selection was made. The design development was carried out under a team participation basis and through this process architectural control and landscape treatment solutions were maintained.

- Hawaii / Mililani New Town: The developer and general contractor commenced the creation of a new community, entirely comprehensively planned for 3,500 acres that is a family oriented, fee simple subdivision in Hawaii's complex real estate market (Hawaii's more common land tenure system is long-term lease). The developer working in co-operation with the County evolved entire design plans to detail. To ensure that the plans would be implemented, the developer was required (as part of the Master Plan approval) to sign a Declaration of Covenants, Conditions and Restrictions. Through this legal process the developer was bound to specifics outlined by the Master Plan approval document. High land costs (compared to the Mainland) required the developer to consider innovative approaches to subdivision such as zero lot line, flag lots, cluster, fee simple townhouse etc. as early as 1968. Total development and architectural control has been maintained from conception to inceptions by the developer. They own a subsidiary general contracting company that implements all of the total designs evolved by the parent company. The General then subcontracts under detailed specifications each phase of work on a select tendered basis

which ensures control throughout.

ALTERNATE BUILT FORMS / COSTS AND COMPARISONS

For purposes of this investigation into alternative approaches to an in-fill housing form, it was determined essential to consider choosing a reasonable size of land parcel and configuration for study (in the existing subdivision context). Furthermore, the Planning team determined that to be realistic, practical and implementable, the alternative concept has to be capable of accomplishment within a given District/Zone guideline. Given the 3 single family lots of 50'x120' or 150'x120' parcel, alternative built form concepts classified as detached and attached were applied.

Detached Built Form Concepts

Single family in-fill housing prices are determined primarily by the land component. A typical in-fill development process will require the purchase of land and existing improvements at market prices. The conventional demolition of these obsolete structures inflate the land value equal to that of the total purchase price. An in-fill developer generally favours the construction of a 1500 - 2000 sq. ft. home, increasing the total value to $180,000 - $250,000. Consequently, an over-built, over-sized and over-priced product protrudes on a 50'x120' lot.

A desired alternative (where achievable under the R-2 district) practiced by developers is the process of dividing a typical 50'x120' lot into two 25'x120' lots by split-title. The maximum density has been increased to six units per 150'x120' parcel.

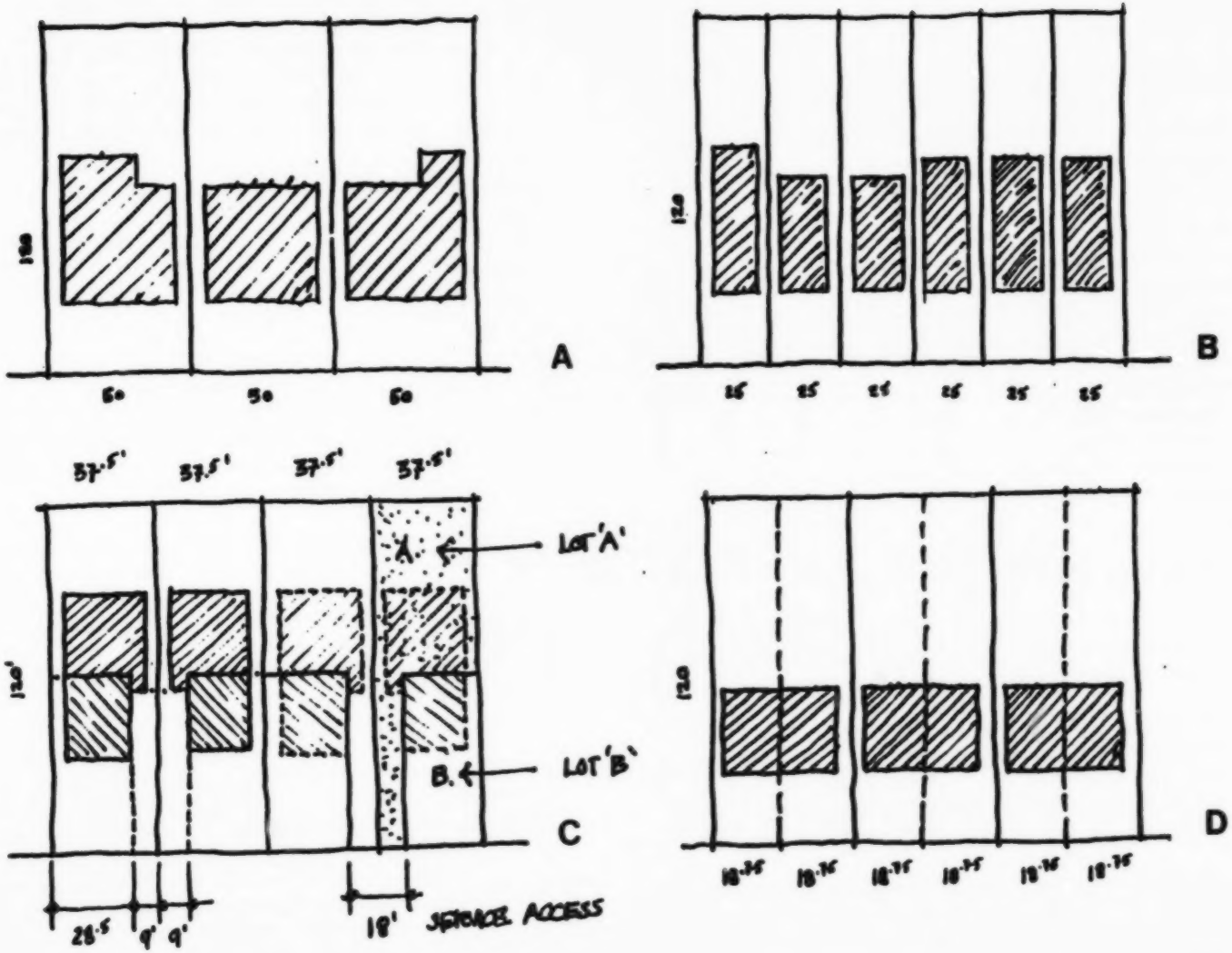
Consequently an initial reduction of lot prices will be established. However, additional costs are incurred through required servicing, legal and surveying fees, architectural geometric designs (to conceal the apparent elongated rectangular form), which result in a 10-15% cost increase of materials and labour. Current sizes of new houses being marketed are approximately 1300 - 1800 sq. ft. with a corresponding price of $135,000 - $185,000.

Attached Built Form Concepts

The duplex is an attached housing concept which is the most similar to a single family dwelling in built form. The costs efficiency of the concept is evidenced in the reduction of per unit land costs and utilization of surface and subgrade common walls. This approach has the potential to create affordability, however, is seldom produced in the in-fill market because of the strong prevailing market desire for the single family detached form of housing.

For further comparison purposes, research of maximum cost efficient land use and built form concepts required the investigation of row townhousing. Calgary's Land Use By-law dictated RM-1 zoning as being essential for row townhousing. This classification allows 8 units per 150'x120' parcel of land. Cost efficiency is maximized by the reduced per unit land costs, capitalization of common wall (surface and subgrade), stacked plumbing and overall lower wall-to-floor ratio.

Conventional row housing architecture and planning neglects to provide single family character and discourages family lifestyle. Consequently the most cost efficient (comparatively speaking between single family detached, single family semi-



ALTERNATIVE APPROACHES

detached. However, the least desirable alternative form of affordable family shelter in an in-fill context.

Semi-Attached Cluster Form - Alternative Concept

Figure IV illustrates an alternative land use approach providing 8 units upon the 150'x120' parcel based on RM-1 guidelines (modified). The cluster approach to land use with its architectural built form design of single family character, demonstrates numerous cost efficient benefits. The cluster provides lower per unit land costs, minimized off-site servicing, availability of stacked interior servicing, less overall surface area and intrinsic energy savings by virtue of design. The single family character and the pleasing relation of the interior house design to the hierarchy of different types of open space furnishes the demand of family lifestyle at an affordable price.

Preliminary Findings

- In-fill serviced lots that are vacant and developable are not readily found within the older community/neighbourhoods of the City.

- Standard 50'x120' lots with older existing houses that may be considered for re-development due to obsolescence and economic life are available. Such properties however require purchase at market value (land and improvements).

- Current average market values/prices of older homes on 50'x120' lots have been found to be in the range of $88,000 (1981) to $90,000 (Sunnyside - Hillhurst).

- Current narrow lot (25') detached in-fill housing that is being marketed suggests average minimum price range of $140,000 to $160,000.

- The narrow lot in-fill housing either attached or detached is lacking from a standpoint of acceptable design, liveable environment and affordable threshold to households with family.

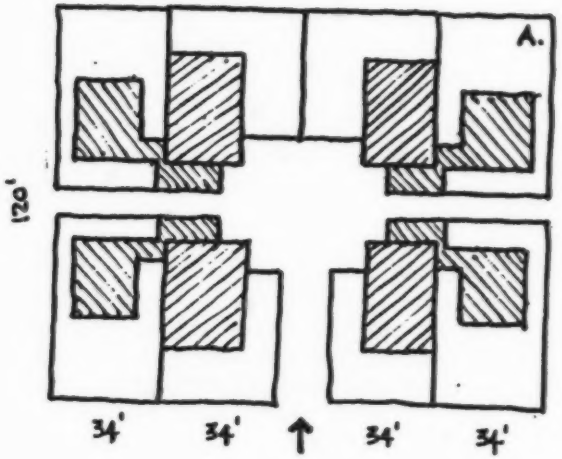
LEGAL OWNERSHIP ISSUES

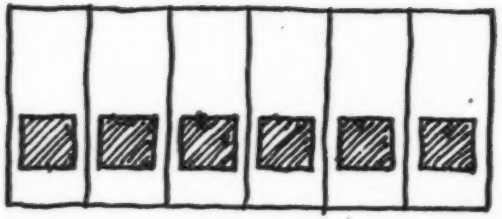
Investigation into existing legal structures of habitat ownership show that there exists two basic alternatives for proprietorship:

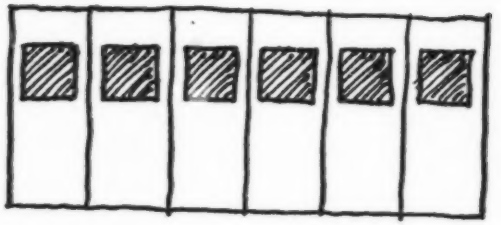
1. fee simple
2. condominium*

*Cooperative ownership is legally condominium and differs from condominium only in terms of the financing arrangements.

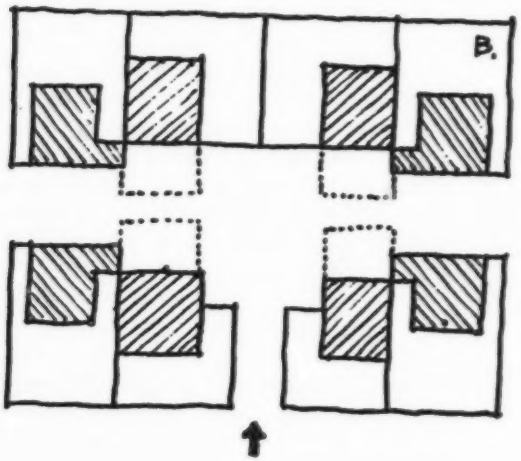
Investigation focussed upon applicability of these basic legal parameters to prototypical housing configurations and the possible variations and combinations that can and do exist between the fee simple and condominium. Exceptions to the standard fee simple and condominium ownership can make the difference between either simple or complex legal definition. In principle almost any configuration of ownership can be defined. Ownership can be defined around a unit, or around a property; ownership can be defined three-dimensionally if necessary. It can be defined in terms of maintenance access and in terms of maintenance costs/sharing responsibility. The legal arrangements may therefor be prepared to accommodate almost every need. Of considerable importance to this issue is the fact that: simple legal definition makes for easier marketability; conversely, complicated definition makes for a more hesitant buyer.

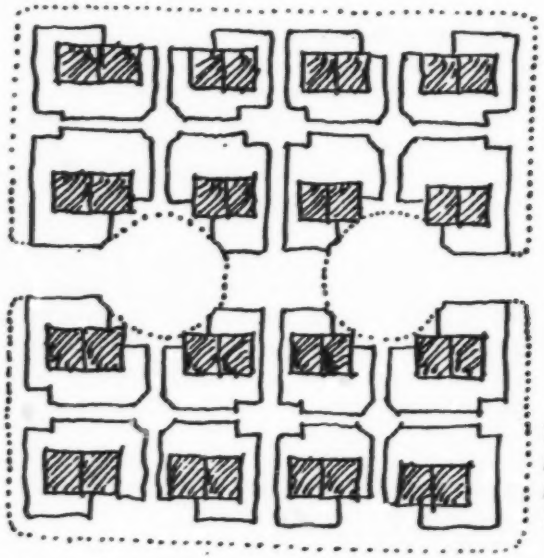






TYPICAL STREET
¼ BLOCK





POSSIBLE
ALTERNATIVE
APPROACH WITH
INCREASED DENSITY

STUDY OF CLUSTER APPROACH

Areas of Concern

- Arrangements that present complexity and difficulty for simple legal interpretation.

- Limits to which legal contracts are binding and limits to which they correspond to social intent.

- Limits of legal definition as defined by prior Acts.

a) Party Wall Problem

b) Maintenance Access Easement Required in Zero Lot & Modified Zero Lot Line & Laneless Subdivisions

c) Ownership of Common Area

i. Restrictive covenant on title is negative e.g. "you shall not build here" and is always binding. If it was positive it would not bind the next owner who buys the house i.e. you can only have a negative covenant on open space.

ii. Condominium corporation can be set up to maintain common area. Ownership could be around unit or around property line e.g. it could be around unit with exclusive use of property to owner. But this would have market implications.

iii. A non-profit company where shareholders are unit owners can be structured where the company has the power to levy a maintenance charge.

CURRENT RANGE OF HOUSING AND AFFORDABILITY

Historically, South Calgary experienced accelerated growth due to natural desirable setting, proximity to Glenmore Reservoir waters and greater abundance of coniferous trees and other flora. These influences concurrent with larger geographic and population factors account for South Calgary commanding approximately 40 - 44% of all multiple listing sales.

East Calgary represents approximately 30 - 33% of all sales and provides the lowest average price of Condominium and Residential dwellings. The North Calgary sector displays the lowest volume of all three areas. It can be considered the medium priced area where activity has maintained a constant level and where all development and growth experience has been the least. In all three sectors moderate price advances occurred for the Residential dwellings, whereas Condominium price increases have been more apparent.

A common denominator exists indicating Condominium prices 27 - 33% less than Residential. Considering the current market climate in Calgary where high housing costs prevail, the recent surge to a more affordable alternative offered by Condominium ownership is manifest. Current buying patterns indicate a sales/listing ratio of:

30% Residential
40% Condominium

Based on current findings, the demand for an affordable single family house exists in the under $100,000 bracket, while Condominium trends (depending on the sector) give preference to a less than $80,000 price range.

Calgary's present in-fill housing activity has concentrated in the older market districts to the north, however, growth potential exists to the south of the downtown core. Potential south districts currently experiencing higher density in-fill are commanding average house/land prices of $112,124 for re-development. Concurrently North Calgary districts with potential in-fill housing demand $109,000 for house/land.

Following the existing developer procedures analyzed through this study, conventional affordable family housing is difficult to achieve. Innovative action by developers and Government sectors are needed to find ways and means of achieving alternative forms of affordable shelter.

PHASE II

PHASE II

EXISTING HOUSING MARKET RANGE OF OPTIONS

Single Family

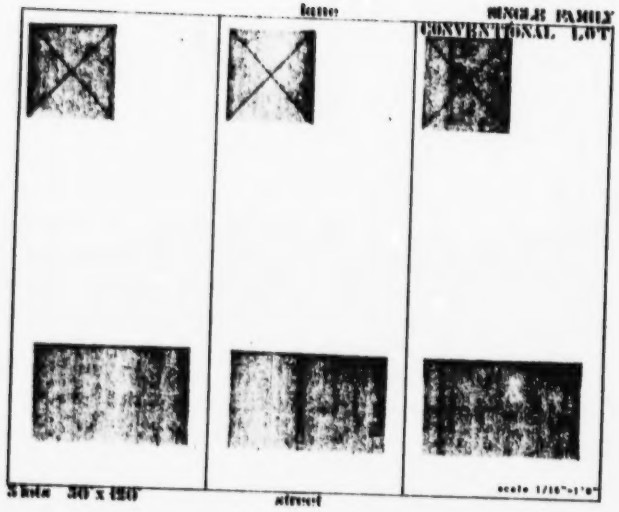
During the last five years Calgary's in-fill housing market returned to the historic trend of narrow lot housing. Based on our preliminary investigation, 50 ft. and 25 ft. lot in-fill housing appears not to be a viable alternative to affordable family shelter. Contributing and influencing factors are: land prices; City of Calgary By-laws with their charges and requirements; lack of innovative planning and architecture; rigid opposition to change by community associations; builder/developer hesitancy to change; and the current status of our economy, both Provincial and Federal.

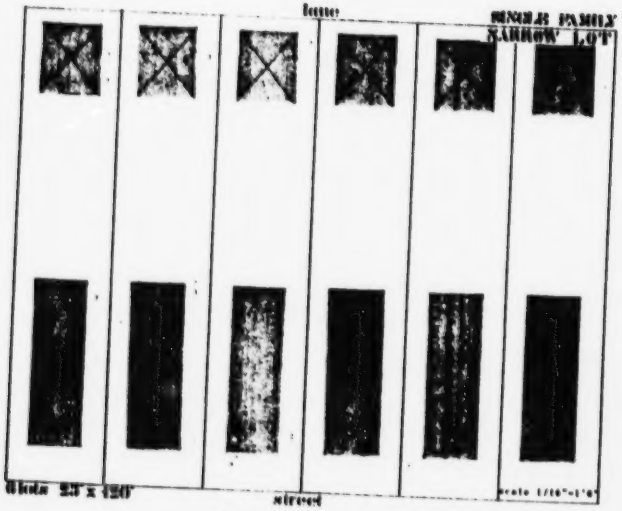
To date, developer objectives regarding in-fill housing involved the 'split-title' of a 50' lot into two 25' lots, constructing an expensive spacious built form with limited functional open space and without respect to affordability. Depending largely on the location (close to downtown, surrounded by mature flora, river and neighbourhood amenities) and the use of geometric architecture to built form facades, the in-fill housing market experienced success by promoting the product to a select high income career couple market. This consumer acceptance deterred developers, the professions and the City from creating innovative and affordable family shelter. More recently, however, the affordability crisis surfaced to public awareness as interest rates remain high and the economy continues into a prolonged recessionary spiral.

Historically, one of the underlying problems within the Calgary housing industry has been the developer's preconception of market needs and the accepted notion to construct spacious and costly improvements on expensive land. This estate lot mentality is contradicting the economic development of narrow lots and smaller houses in the suburbs.

Although the City of Calgary appears concerned regarding affordable shelter, the existing By-laws manifesting various charges and requirements substantially contribute to the cost of the in-fill housing market. In fact, current By-laws and requirements promote the more costly suburban subdivisions where infrastructure, schools, services and transportation systems must be developed. Modification of existing City By-laws together with reduced charges and requirements accompanied by an approval procedure to expedite in-fill housing would: increase overall average unit density, reduce housing costs, capitalize on the inherent value of existing services and amenities, as well as reduce the overall community tax burden. In addition, a more affordable home would encourage family lifestyle as opposed to singles or couples and achieve the desired density.

Many existing community associations appear to discourage privately initiated higher density developments and influence approval bodies to dictate costly development guidelines. Rigid guidelines pertaining to materials and design combined with current By-laws can in fact restrict innovation.





EXISTING RANGE OF OPTIONS

Community concerns must be directed to a combination of innovative land use and cost efficient built form in order to reap the benefits of controlled increased density.

Duplex

The duplex procured a limited degree of success as an in-fill alternative in select mature districts, however, it emerged as a successful alternative form of housing in the suburbs. To date, in-fill development of duplexes appears limited due to developer hesitancy and consumer resistance. In other words, the cost difference between single family narrow lot housing and duplex is not substantial enough to penetrate a lower income bracket market and the stigma of attached duplex housing targeted for the higher income bracket discourages consumer acceptance.

Under current in-fill development conditions, consumer resistance coupled with land prices and high interest rates makes the feasibility of affordable duplex housing questionable.

Townhouse

The townhouse as a medium density form of housing creates a potential alternative to affordable shelter. By virtue of increased density and traditional townhouse design, the land costs per unit are decreased and the cost efficiency of construction is increased (i.e. reduced wall-to-floor ratio, reduced surface areas, stacked servicing techniques etc.). Much of the current in-fill townhouse complexes, however, lack innovative site planning and architectural design, and are developed only for the higher income and/or career couple market wherein the developer realizes a greater gain without any added efforts in design innovation.

However, innovative site planning is critical given the inherent potential of larger land parcels where family oriented housing may be founded. The townhouse form offers greater planning/architectural flexibility and potential to new development approaches. Traditional row townhouse site planning and building massing, however, reflects with difficulty the single family character and usually only through the cosmetic design of facades.

The variables accompanied with a larger parcel of land allows possible attainment of an innovative site plan and built form design. It could result in a development to appear single family in character while maximizing the higher density granted. Under current economic and real estate conditions in Calgary where single family character of housing within affordable limits is desired, industry members must address innovation in this density bracket in order to create affordable family shelter.

Cluster

The Cluster In-fill Concept design has medium zoning applications (RM-1). The combination of increased density with underlying cost reduction values and the larger parcel of land required, permits an innovative approach to site planning and architecture. By virtue of density, the Cluster Concept reduces uncontrollable costs per unit such as land, services, taxes, interest, and overall construction costs. Contrary to the traditional townhouse, the Cluster Concept provides more efficient use of open space with distinct individuality of built form units. It gives added flexibility of varying price ranges of units while visually manifesting a reduction in apparent density and providing a single family character. In general, the Concept provides sociological and

environmental benefits. Utilization of higher density zoning while providing single family character appears to contribute to affordable housing and satisfy the single family dwelling demand.

Option Costs

The effect of option costs manifest in new homes within Calgary's current market place was analyzed and compared to the total price of a predetermined class of home. The exercise was an integral part of the overall affordability study; in that study built form component costs and implications on the total price needed to be assessed. Options selected and analyzed are commonly included in current new homes and constitute approximately 25% of the total house price. The objective was to ascertain this ratio, to determine the possibilities of eliminating all or portions of the options, to determine the cost saving potential, and to determine the possible acceptability level of today's consumer.

Subjective economic conclusions would indicate other components such as land, materials and labour cost would decrease prior to the elimination of all or part of the described options.

PROPOSED ALTERNATIVES

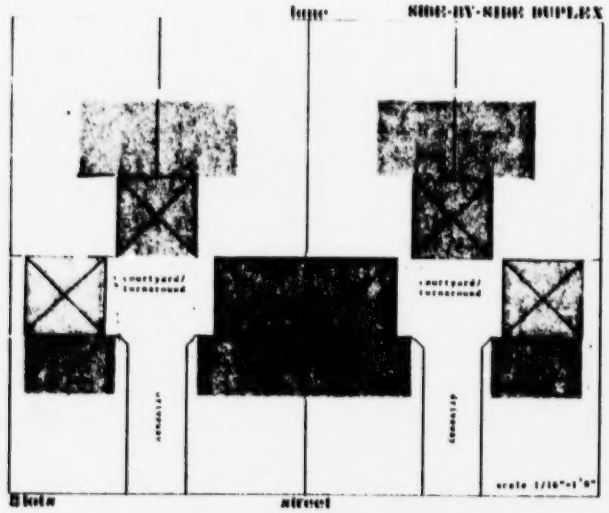
Previous investigation of land use and built form concepts resulted in the development of three possible options to increase density in an in-fill situation. These alternatives have been conceived to work within the three 50' lot configuration of 120' x 150' (18,000 sq. ft.) site limits. Historically, the commonly accepted process to reduce overall costs has been through increase of per unit density. As determined by previous investigation, the City has been gradually permitting smaller lots in single family residential zones. Current in-fill housing experience however, indicates market dissatisfaction with existing new houses from a number of standpoints; two critical aspects being built form design and affordability.

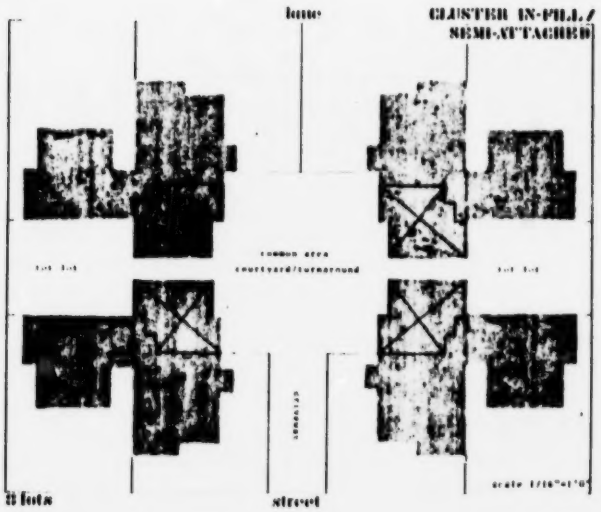
The proposed alternatives have been studied and developed to firstly reduce the land component cost through increased unit density; and secondly, to evolve a more efficient built form design that relates more effectively and usefully with surrounding lot space.

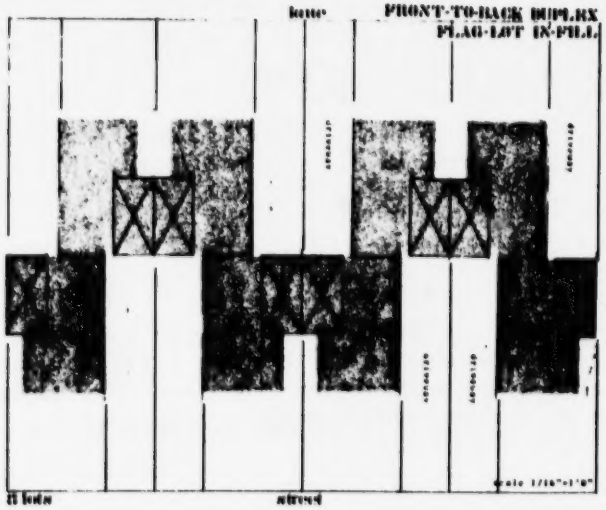
A number of approaches utilizing different forms of duplexes (up-and-down, side-by-side, and back-to-front) were studied. The different types were applied against 6 lots of 25 ft. frontage and against 4 lots of 37.5 ft. frontage. The resultant built form and spatial relationship suggested available options and these were further developed as follows:

Alternative I Side-by-Side Duplex (8 units)

The side-by-side duplex increases building coverage on the land, resulting in increased development intensity. i.e. less open space. Under this approach it is possible to attain 8 units within the 120'x150' site. Ownership would be accomplished by condominium with each unit designed to be a split-level home incorporating a 2-car garage in the total built form. This layout envisages two 4-unit enclaves to be created around two auto entrances and off-street parking compounds. Each unit has individual ground floor access and outdoor private yard space.







PROPOSED ALTERNATIVES

Alternative II Front-to-Back Duplex (8 unit) Flag Lot In-fill

The front-to-back duplex provides the same area of building coverage as the side-by-side form, however, by its orientation it provides an opportunity for innovation. This form provides each unit with direct ground access together with individual lot area providing open private yard space. Its orientation gives a feeling and visual effect of single family appearance as only 4 buildings are fronting the street. Each unit is accessible from the fronting street, however, to provide individual land parcelation for each unit, this alternative requires the implementation of flag-lots. The use of this alternative approach against four 37.5 ft. frontage lots can result in 4 individual buildings haveing 8 unit accesses. By implementing flag-lots, each 37.5' x 120' lot would be subdivided into 2 additional lots as indicated.

This alternative provides certain advantages to ease of implementation. Eight individual parcels can be created to accommodate 4 duplexes with individual ground floor access and private yard space. All of the lots created would have frontage upon the existing street. The applicable innovations would be the creation of flag-lots and the use of common service/utility trenching to service these lots.

Alternative III Cluster In-fill / Semi Attached (8 units)

From the foregoing studies it became evident that an approach utilizing semi-attached housing forms would provide a greater design flexibility. Hence, a number of different approaches were examined and through this process, the concept of a cluster form of semi-attached units surrounded by a 'hierarchy of spaces' was conceived. Eight semi-attached units are sited in such a way that they appear substantially as separate individual homes. The units are so designed that they attach across a very short common plumbing wall (for toilets) located back-to-back. Each house is given an attached 1-car garage with space for a second car limited to on-street parking. Every unit opens directly onto its own private yard and otherwise backs onto common open space. The 8 semi-attached units are clustered around a common access turnaround which connects in either direction with 2 smaller common tot lot spaces. These common spaces are intended to be hard-surfaced for low maintenance use and conceived for childrens' play areas protected from traffic and are observable from adjacent unit interiors. The entire complex of 8 units will be under condominium ownership. Every unit is sited upon its own private lot and conceived to be privately owned and maintained. Only the common access driveway/courtyard and smaller common space for tot lots will be owned and maintained under condominium ownership.

CALGARY DEVELOPMENT GUIDELINES

The Calgary Land Use By-law is summarized in the adjoining tables as it pertains to the 150' x 120' land parcel under R-1, R-2, R-2A and RM-1 zoning districts. These tables also provide a detailed comparison of the three alternatives against the above zoning classifications.

The By-law also restricts potential basement suite development in the concept alternatives under R-2 and R-2A zoning. R-1 and RM-1 zoning have no stated restrictions in this regard.

Optimum Approach Selected

The Cluster In-fill Concept has been determined as implementable under the existing Calgary Development Guidelines based on the adoption of the following procedures:

1. Firstly, conditions of approval must come under the Direct Control Zone (DC) of City Council;

2. Secondly, guidelines to be followed under the (DC) approval will call for a modified Residential Low Density Multi-Dwelling District (RM-1) framework.

The above approach will provide an optimum allowable guideline and procedure to follow to gain approval by the City without delay or difficulties. Under the (DC) zone conditions, the Cluster In-fill Concept is permitted to be readily accepted and implemented. Approval is attainable under this comprehensive approach in spite of modest infringements of certain requirements and conditions. The Cluster In-fill Concept substantially meets the density, building coverage, front, back and side yard set-back requirements set down under the RM-1 guidelines. Areas of differences and infringements have been noted. Approval through the (DC) process calls for stating the guidelines that the development intends to substantially adhere to. Thus, as this alternative concept was basically evolved following the requirements dictated by the RM-1 guidelines, any request for approval from the City of Calgary must be stated as DC with RM-1 guidelines.

THE ALTERNATIVE CONCEPTS: IMPLICATIONS AND LIMITATIONS

Existing Zoning By-Law

A review of the Alternative concepts against conditions of the existing City of Calgary Land Use By-law indicates the following:

Alternative I Side-by-Side Duplex (8 units) Cluster

This alternative concept will require to be considered under a comprehensive development control zone as the clusters of 4 unit enclaves cannot be implemented and marketed other than by condominium ownership. The concept provides an interesting pattern of building-to-open space relationship and gives each unit ground floor access to a private yard space. Two car parking off-street is possible for 4 units, whereas the other 4 are designed for 1 car parking per dwelling.

Each larger unit sits on a site area of approximately 2250 sq. ft. and each smaller unit occupies approximately 1670 sq. ft. All units share in the common open space of the driveway turnaround/courtyards. The area per unit is slightly less than the minimum allowable within the By-law, however, because of the site planning design, each unit is provided greater useable private yard space.

The concept meets practically all of the RM-1 guidelines with the exception of the 2 single-dwelling units at each end of the clusters which require to be considered as zero-lot line siting and calls for maintenance easements to be implemented.

To advance this concept will require applying for (DC) Direct Control zoning approval with RM-1 guidelines.

While this concept is suggested as a possible

Density Allowable R-1, R-2, R-2A, RM-1

Given a 120' x 150' land parcel, the density allowed under R-1, R-2, R-2A and RM-1 zoning would be as follows:

R-1*(Infill): 4.52 units/.41322 acre = 10.94 units/acre

R-2*(Semi-detached infill): 7.18 units/.41322 acre = 17.37 units/acre

R-2A (Townhouse): 12 units/acre (Same as R-2 except in the case of Townhousing for a comprehensive development)

RM-1: 18 units/acre - 1 parking stall at surface per unit
72 units/acre - 1 parking stall underground per unit

Building Coverage and Site Area

For R-1, R-2, R-2A and RM-1 zoning classifications, the following building coverage (lot coverage) and site areas (lot area) are required:

	Lot Coverage	Lot Area
R-1	45% maximum	370m² (3980ft²) minimum for infill
R-2	45% maximum	minimum: - 233m² (2500ft²) single detached - 466m² (5000ft²) duplex - 466m² semi-detached, minimum 186m² (2000ft²) for 1 of the 2 dwelling units
R-2A	45% maximum	(same as R-2)
RM-1	60% maximum (40% minimum landscaping)	N/A

CITY OF CALGARY BY-LAW REQUIREMENTS

MINIMUM REQUIREMENTS	RESIDENTIAL DISTRICT			
	R-1	R-2	R-2A	RM-1
FRONT YARD	3m	3m	3m (variable for townhouses)	3m
SIDE YARD	1.2m or 2.4 easement	1.2m or 2.4 easement	1.2m or 2.4 easement	1.2m
REAR YARD	7.5m	7.5m	7.5m	6m
BUILDING HEIGHT	10m	10m	10m	9m
LOT WIDTH	12m	15m (duplex) 6m (1 unit semi-det)	15m (duplex) 6m (1 unit semi-det)	N/A
LOT AREA	370m²	466m² (duplex) 186m² (1 unit semi-det)	466m² (duplex) 186m² (1 unit semi-det)	N/A
LOT COVERAGE (maximum)	45%	45%	45%	60% (40% minimum landscaping)
PARKING/UNIT (inner city)	1 space	1 space	1 space	1 space
DENSITY	10.94 units/acre	17.37 units/acre	12 units/acre (comprehensive townhouses)	18 units/acre
BUILDING SEPARATION	N/A	N/A	N/A	3m

ALTERNATIVE I SIDE-BY-SIDE DUPLEX

AREA OF INFRINGEMENT*	RESIDENTIAL DISTRICT			
	R-1	R-2	R-2A	RM-1
FRONT YARD	none	none	none	none
SIDE YARD	none	none	none	none
REAR YARD	1.4m	1.4m	1.4m	0.1m
BUILDING HEIGHT	none	none	none	none
LOT WIDTH	3.01m	none	none	N/A
LOT AREA	215m²	161m² duplex 33.6m² 1 unit semi-det.	161m² duplex 33.6m² 1 unit semi-det.	N/A
LOT COVERAGE	none	none	none	none
PARKING	none	none	none	none
DENSITY	8.42 units/acre	1.99 units/acre	7.36 units/acre (townhouses)	1.36 units/acre
BUILDING SEPARATION	N/A	N/A	N/A	1.93m**

*NOTE: The figures indicated denote the total area/amount by which the Concept infringes upon District Guidelines. Approval through relaxation and/or (DC) Direct Control request required.

** May be overcome by architectural treatment e.g. cross connector as breezeway.

CITY OF CALGARY BY-LAW SUMMARY

PROPOSED ALTERNATIVE I

ALTERNATIVE II FRONT-TO-BACK DUPLEX (FLAG-LOTS)

AREA OF INFRINGEMENT*	RESIDENTIAL DISTRICT			
	R-1	R-2	R-2A	RM-1
FRONT YARD	none	none	none	none
SIDE YARD	none	none	none	none
REAR YARD	none	none	none	none
BUILDING HEIGHT	none	none	none	none
LOT WIDTH (average)	6.28m	9.28m duplex 0.28m 1 unit semi-det.	9.28m duplex 0.28m 1 unit semi-det.	N/A
LOT AREA	161m²	23m²	23m²	N/A
LOT COVERAGE	none	none	none	none
PARKING	none	none	none	none
DENSITY	8.42 units/acre	1.99 units/acre	7.36 units/acre (townhouses)	1.36 units/acre
BUILDING SEPARATION	N/A	N/A	N/A	0.6m

*NOTE: The figures indicated denote the total area/amount by which the Concept infringes upon District Guidelines. Approval through relaxation and/or (DC) Direct Control request required.

ALTERNATIVE III CLUSTER IN-FILL SEMI-ATTACHED

AREA OF INFRINGEMENT*	RESIDENTIAL DISTRICT			
	R-1	R-2	R-2A	RM-1
FRONT YARD	none	none	none	none
SIDE YARD	none	none	none	none
REAR YARD	2.9m	2.9m	2.9m	1.5m
BUILDING HEIGHT	none	none.	none	none
LOT WIDTH	2.1m	none	none	N/A
LOT AREA	159m²	49m² duplex none for 1 unit semi-det.	49m² duplex none for 1 unit semi-det.	N/A
LOT COVERAGE	none	none	none	none
PARKING	none	none	none	none
DENSITY	8.42 units/acre	1.99 units/acre	7.36 units/acre (townhouses)	1.36 units/acre
BUILDING SEPARATION	N/A	N/A	N/A	1.17m**

* NOTE: (see other page)
** May be overcome by architectural treatment e.g. cross connector as breezeway.

PROPOSED ALTERNATIVE II

PROPOSED ALTERNATIVE III

alternative, there are some disadvantages, namely: lack of marketability of the duplex and the considerable site area that is devoted to the automobile.

Alternative II Back-to-Front Duplex (8 unit) Flag-Lots

This alternative concept calls for the use of flag-lots and the provision of rear lane access. The disgn provides each duplex to be sited on a 37.5' x 120' lot of 4500 sq. ft., giving each unit a site of 2250 sq. ft. The flag-lots are designed with a 25' front at its widest end and 12.5' on the narrow flag portion. The By-law provisions under R-2 and R-2A call for a site with a lot area of 2500 sq. ft. per unit, hence this alternative is 250 sq. ft. below requirement as a duplex under these zones. Servicing of the rear flag-lots can be undertaken by a single common service line along the property boundary of the flag portion of the lot. The common service trenching will require the placement of a caveat of each adjoining lot. All other conditions and requirements are basically met following the R-2A guidelines. However, certain aspects of the concept will be subject to interpretation and acceptance. If the flag-lot subdivision cannot be readily approved under R-2A, then the concept will require a (DC) Direct Control zoning with R-2A guidelines.

A disadvantage of this concept is the fact that it does not remove the stigma of duplex housing. Furthermore, the front unit land parcel is reduced to a fairly small size which may not be acceptable by the market.

Alternative III Cluster In-fill (8 unit) Semi-Attached

This alternative is a concept based upon a comprehensive development approach, hence immediately calls for (DC) Direct Control approval. The concept utilizes 4 semi-attached building forms (comprising 8 units in cluster) designed and sited in a comprehensive manner. Accordingly, the innovative planning approach requires the development to be marketed as a condominium. The condominium plan will, however. describe individual lots for each unit with common interest in the driveway turnaround/courtyard and two small tot lots that are linked to it. Individual units and attached garage will be maintained singularly by each unit owner, whereas the common area maintenance will be charge to the 8 unit cluster as a group/condominium.

The scheme is substantially in keeping with the RM-1 guidelines, however, does infringe on certain areas. The density requirement calls for relaxation as the concept is slightly over the limit provided. Depending upon interpretation of the design against By-law requirements, the concept infringes slightly upon certain yard requirements or by a marginal degree upon the question of separation of units.

While this alternative provides for only 1 car garage parking off-street, and otherwise does not permit fee simple ownership, its superior site plan advantages overshadow any negative factors. The concept provides for good family environment and home ownership supporting such lifestyle similar to single family residential forms.

Note

Building Code requirements are documented in Phase II working papers.

SERVICING STANDARDS

For the three Concept Alternatives I, II, & III, there are described a number of possible servicing schemes. The following have been identified:

Servicing Scheme 1 - Alternative Concept I

This scheme is a servicing solution (with minor variation - see plan) which has been identified for Alternative I 'Side-by-Side Duplex (8 units)'. In this proposal services are combined in a common trench for two adjacent clusters and unit services are individual off a common leader. There would be two man holes required (as per the attached drawing). The basic connection costs are estimated as follows: 2 connections x $5,000 = $10,000 (approx.)

Servicing Scheme 2 - Alternative Concept II

The City's 5.5m (18 ft.) minimum lot width standard requirement for individual lot servicing is exceeded as the lot width is 25 ft. Therefore all 25 ft. lots on the side where the utilities come in must be individually serviced.

Each 37.5 ft. frontage contains 2 flag-lots and is serviced by one sanitary and one water service as common connections for both units.

The services are proposed to be installed under the floor slab of the front unit through to the second unit in the back.

This approach is a clean and economical way of servicing a duplex but the units are not serviced individually. This scheme would therefore require a major change in the City's servicing policy.

This proposal requires a condominium servicing agreement drafted between the 2 unit parties. There would be 4 connections to the existing sewer and water main and the estimated basic cost is: 4 connections x $5,000 = $20,000 (approx.)

When the existing deep City services are located in the lane, then an identical solution is manifest, however there is substantial savings in connection costs as suggested by the estimated basic cost: 4 connections x $1,500 = $6,000 (approx.). (This is due to shorter runs and no sidewalk curb or asphalt).

Servicing Scheme 2A - Alternative Concept II

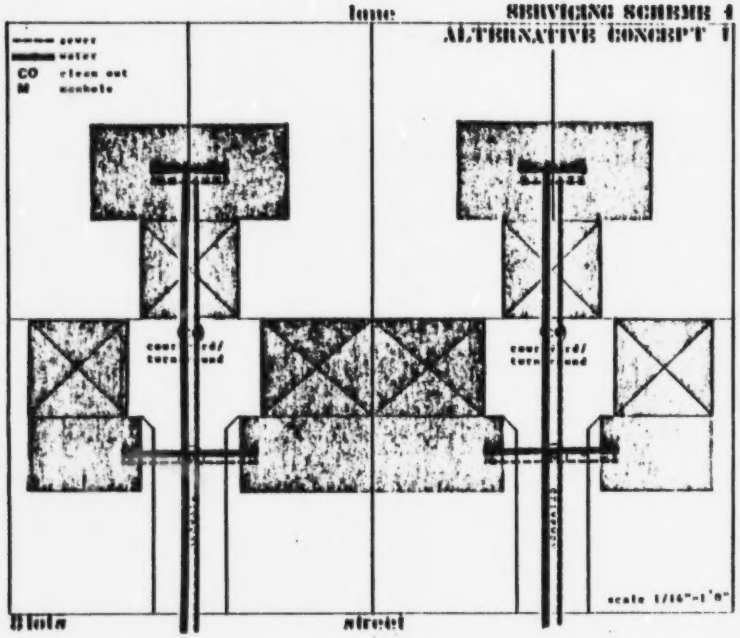
All 25 ft. lots must be individually serviced from the existing fronting street where the utilities are found.*

As such, this scheme proposes that the back lot units receive services through a combined trench for two adjacent clusters. Back unit water lines come off individual headers and this gives the advantage that each unit has its individual water service, complying with the City's policy. The disadvantage is the increased number of open cuts to be made in the existing road, curb and sidewalk. The road would be dug up completely and the pavement and sidewalk would require complete restoration.

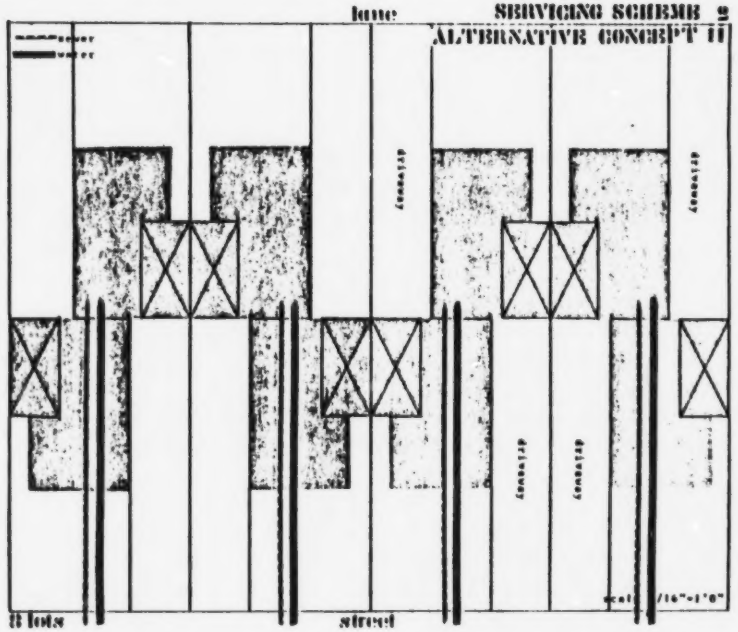
This could be a problem with the City, as water and sanitary are located close to one another where services are combined. The estimated basic cost for this proposal is: 6 connections x $5,000 = $30,000 (approx.)

*Note: the two center 25' lots should always be adjacent to the side where the deep services are located.

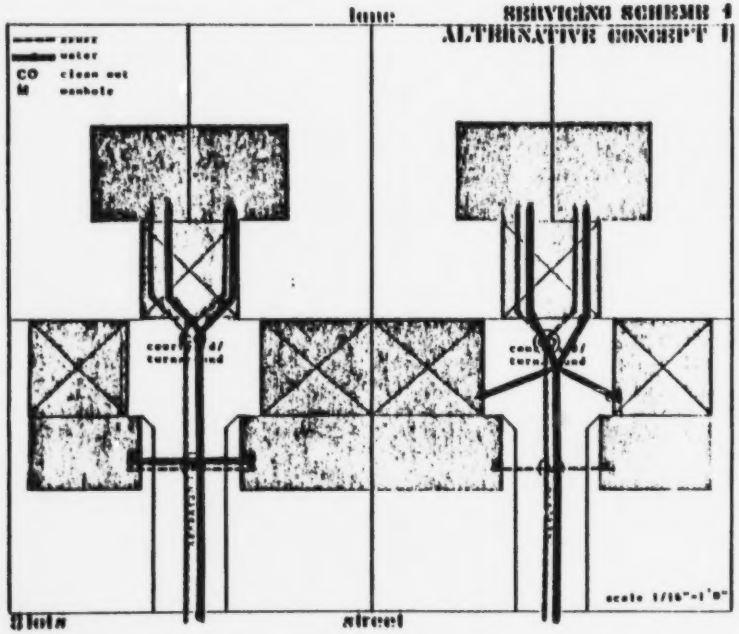
lane SERVICING SCHEME 1
ALTERNATIVE CONCEPT I



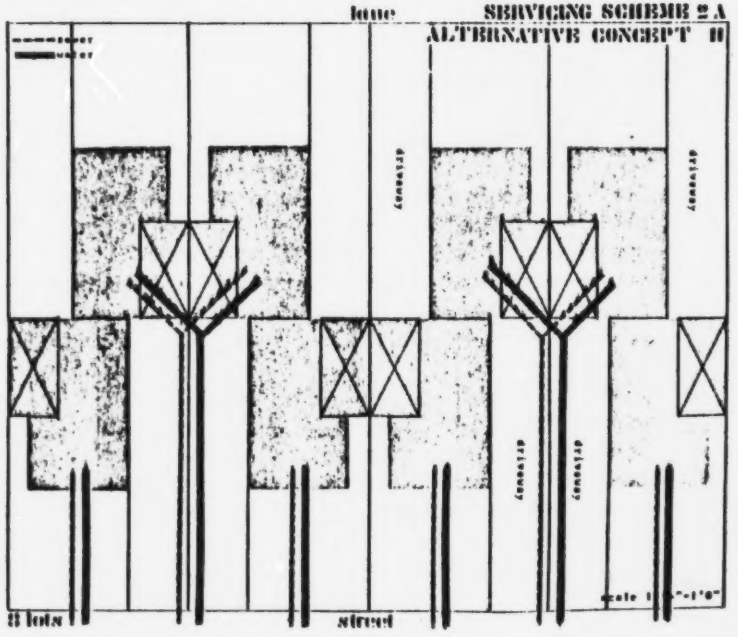
lane SERVICING SCHEME 2
ALTERNATIVE CONCEPT II



lane SERVICING SCHEME 1
ALTERNATIVE CONCEPT I



lane SERVICING SCHEME 2 A
ALTERNATIVE CONCEPT II



When the existing deep City services are located in the lane, an identical arrangement to the foregoing is possible with cost savings in connection costs as described previously. The estimated basic cost is: 6 connections x $1,500 = $9,000 (approx.)

Servicing Scheme 2B - Alternative Concept II (Services combined for two adjacent duplex clusters).

In this servicing proposal municipal services are individually designed off a common leader.

This configuration should receive objections from the City due to minimum distance requirement between services. However, keeping in mind that this is infill housing, this scheme has merits as it reduces the number of connections to be made in the existing road as reflected in the estimated basic cost: 2 connections x $5,000 = $10,000 (approx.)

Servicing Scheme 3 - Alternative Concept III

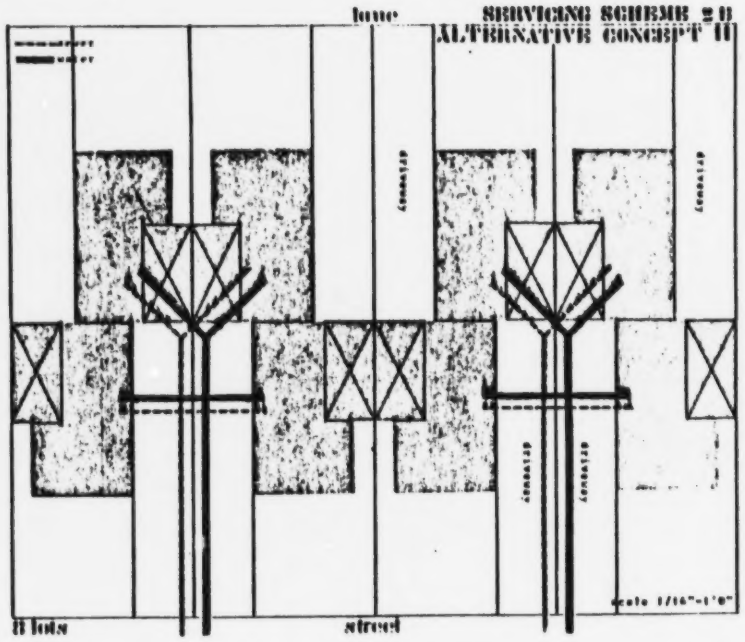
The servicing solution for the 'Cluster In-fill / Semi-Attached (8 units)' consists of services that are combined in a common trench for the complete 8 unit cluster. Individual unit services are individual off a common leader. There would be one man hole required (as per attached drawing). The basic connection costs are estimated as follows: 1 connection x $5,000 = $5,000 (approx.)

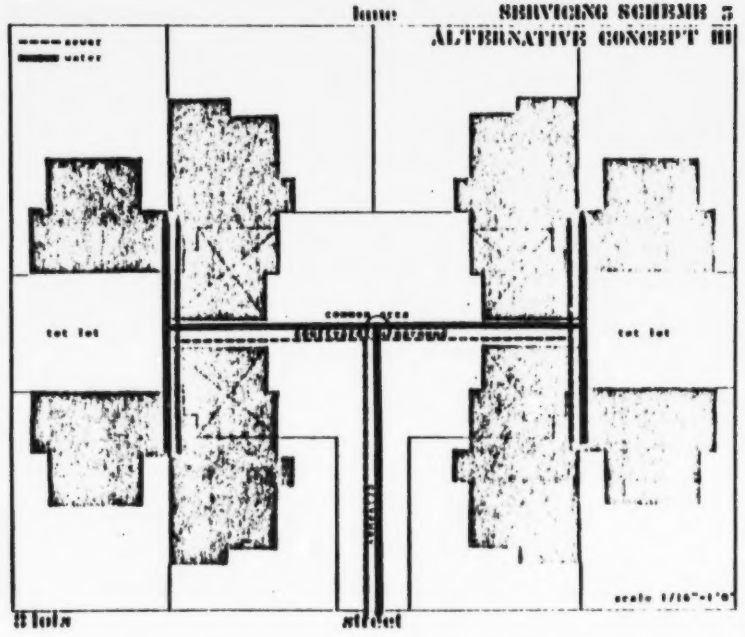
When the existing deep City services are located in the lane, an identical arrangement to the foregoing is possible with cost savings in connection costs as described previously. The estimated basic cost is: 1 connection x $1,500 = $1,500 (approx.)

An access easement agreement on the part of the two center-back lots would be required.

Note

All estimated basic costs are in July 1982 dollars.


lane
SERVICING SCHEME 2 B
ALTERNATIVE CONCEPT II
sewer
water
B lots
street


lane
SERVICING SCHEME 3
ALTERNATIVE CONCEPT III
sewer
water
tot lot
tot lot
B lots
street

PHASE III

PHASE III

LAND USE PLAN

Planning Perspective

Review of existing City of Calgary Planning Department documents relating to older community neighbourhoods of the inner city express the following:

That..."the major problems have been rapid development of the original communities by apartment buildings and the outward movement of families seeking land use stability and better public facilities. If not controlled these trends could result in the loss of the community's family population and housing...Many of the new developments (apartment) lack sensitivity in design for the existing community, are out of scale with surrounding land uses, and do not reflect the character of adjacent properties. Added to these design problems are the generation of high car traffic volumes, on-street parking and lack of amenity space on site..."

Keeping in mind the various problems expressed in the foregoing, planning of the proposed Cluster In-fill Concept attempted to address the various issues while having concern for liveability of environment within a reasonable economic limit.

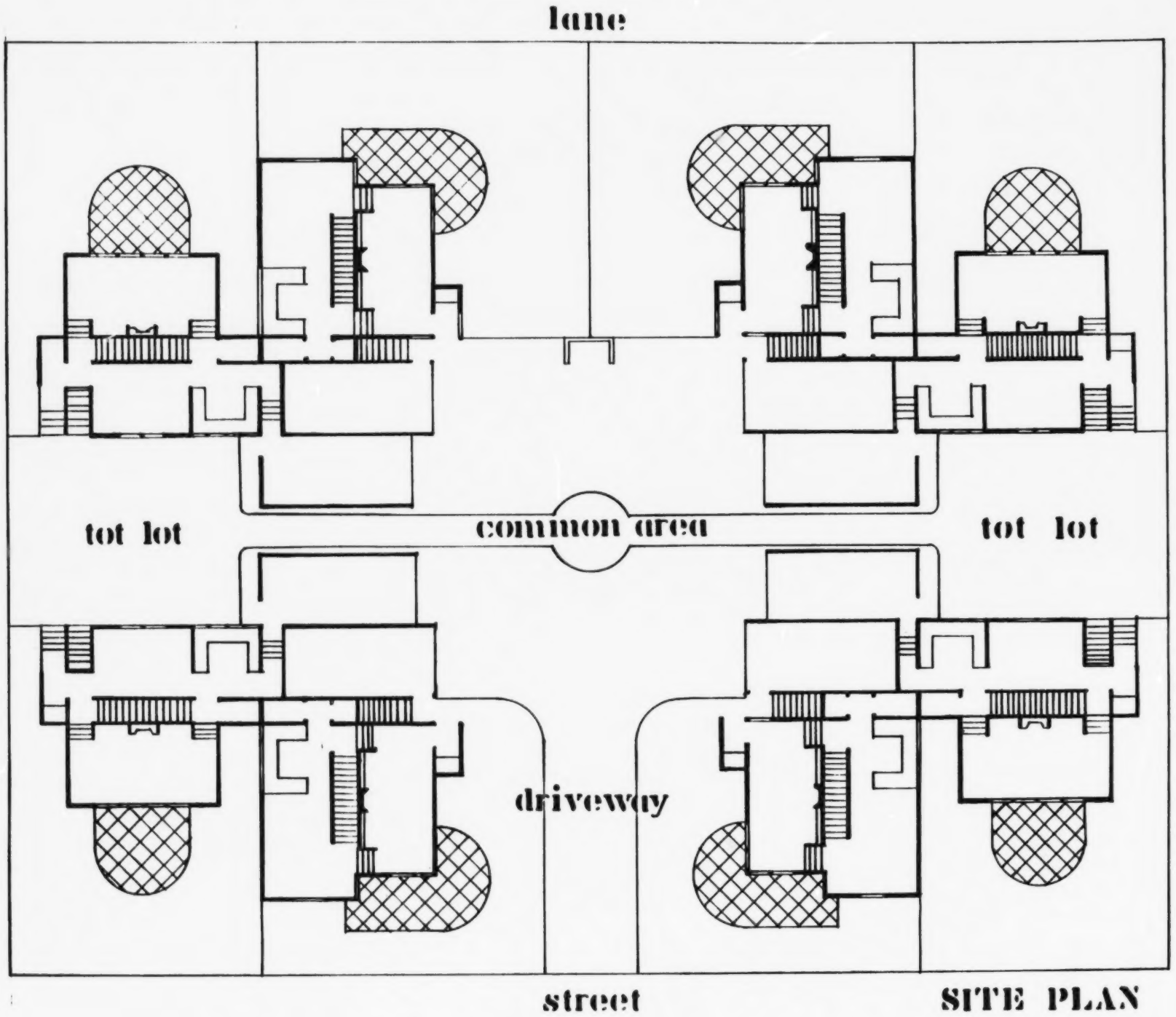
The proposed land use / site plan was conceived for family oriented housing. The design of the built forms are sited with floor plan orientation to useable surrounding private yard space which gives a greater sense of openness and indoor-outdoor feeling to the house.

Through such a siting consideration the land use plan describes a hierarchy of open spaces.

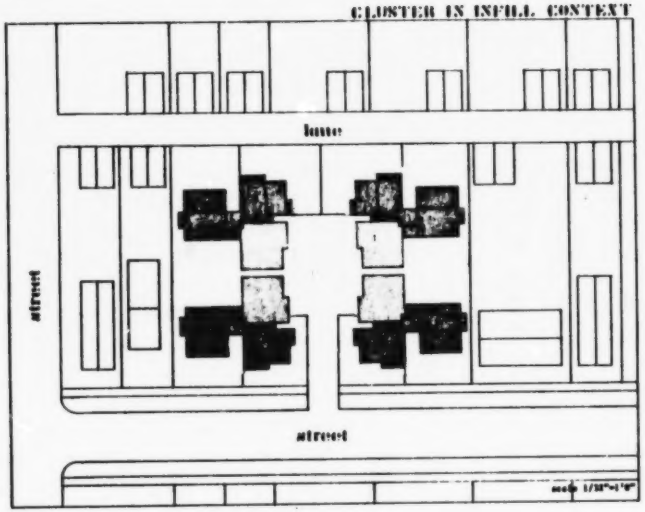
Firstly, each dwelling is given a private yard that is designed to be enclosed by screen fencing. The concept proposes all of the private yards to face the external perimeter of the total site. This orientation in siting is done to give the sense of greater depth from a view within the units. Side yards that are generally limited in use have been reduced to a minimum.

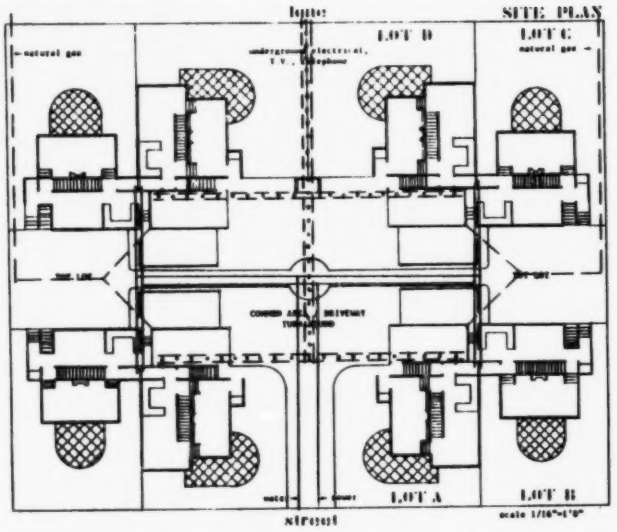
Secondly, internally separating the 4 units on either side of each half of the total cluster are found common entryways that are designed to be landscaped with some form of hard surface. This open space is connected by footpaths to the central common driveway open area and linked in opposite direction to one another. This second level of open common yard space acts as the main entranceway to the back 2 units (4 in total when duplicated). Its protected enclosed form is designed to be in full view from each opposite unit kitchen. This plan allows 'tot' to play safely under observation of mother from within. This common space is open ended to the external side, hence depending upon location and siting of each 8 unit cluster, it may be enclosed by fencing or designed to open on to a connecting walkway, park or open space.

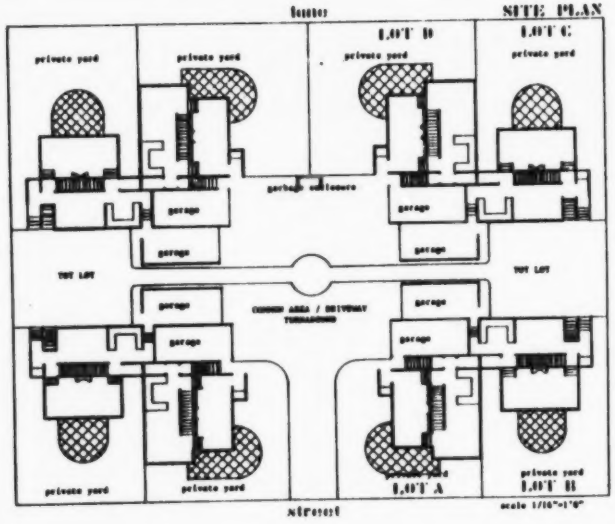
Thirdly, the central open space and driveway provides common use area for auto turnaround and access to parking garages. This common open space is proposed to be hard surfaced with asphalt and



SITE PLAN







THE CLUSTER CONCEPT

CONTEXT, SITE & SERVICING PLANS

interlocking brick for relief and texture. It is possible to provide a gateway across the driveway for privacy and protection if desired. The central hard surfaced open space with linkage to the secondary internal 'tot' lot area will provide protected off-street play space for the young and older children.

A central enclosed garbage pick-up area is located at the end of this open space directly opposite and in line with the entrance driveway.

A breakdown of the land use distribution of the proposed Cluster In-fill indicates that the 18,000 sq. ft. site has a building coverage of approximately 35% with the balance of open space comprised of 24% hard surface and 41% private yards.

Engineering Perspective

The proposed cluster of units is designed for condominium ownership. As such, all services into the site are anticipated to take place off one connection from the City's main lines either in the street or in the lane.

The 2 attached dwellings forming the cluster have been designed so that their mechanical and plumbing facilities are located in close proximity to one another for simplicity of duplicating construction and to gain economy. The siting of the units in their juxtaposition to one another in cluster form was done purposely to attain a simple and efficient layout for connection of all services.

The following desribes the method of approach to planning of servicing:

i. Water: A single line connection with shut-off at the property line is described. Distribution internally to each unit is proposed as indicated by the servicing plan.

ii. Sanitary Sewers: The layout of the cluster arrangement suggests that a central manhole for the T-connection with clean outs located at each end would be the most effective method of providing long-term maintenance-free sanitary sewer service. The location of the line is indicated by the plan.

iii. Storm Drainage: The overall site is comprised of 35% building coverage, 24% hard surface and 41% open yard space. Site drainage for the total hard surface run-off is conceived to flow into catch basins central to each tot lot and drain away from the buildings towards the streets and lanes. The roof storm run-off is proposed to be caught by eavestroughs and down-piped to spill onto the hard surface or grassed yard and into storm catch basins.

iv. Utilities:

- Natural gas is proposed to be brought in from the back lane where it is usually found. To keep the gas line separate from water and sewers, the proposal calls for placement of lines from the lane within the side yard on each side to service 4 units from either direction as indicated on the plan.

LAND USE AREA BREAKDOWN

Land Use	Lot A	Lot B	Lot C	Lot D	Sub-Total	Total	% Total
Common area -driveway/turn-around	--	--	--	--	--	2590 ft²	15.7
2 car lots	--	--	--	--	--	1410 ft²	7.8
Building	573.5 ft²	637 ft²	627 ft²	573.5 ft²	2401 ft²x2=	4802 ft²	26.7
Garage	200 ft²	200 ft²	200 ft²	200 ft²	800 ft²x2=	1600 ft²	8.9
Patio	144 ft²	117 ft²	117 ft²	144 ft²	522 ft²x2=	1044 ft²	5.8
Private area*	514.9 ft²	771 ft²	933 ft²	918.9 ft²	3157 ft²x2=	6314 ft²	35.1
Sub-total Lots A, B, C, D	1432 ft²	1725 ft²	1877 ft²	1836 ft²	6800 ft²x2	---	
Total 8 lots i.e. (2 x Lots A, B, C, D)						= 13760 ft²	
						OVERALL TOTAL 18000 ft²	100.0 %

(* denotes yard space and does not include 1/8 of the common area)

LAND USE DISTRIBUTION

BUILT FORM AREA BREAKDOWN

Building Component	Unit A - 3 bedroom	Unit B - 2 bedroom
Entrance area	13.5 ft²	24 ft²
Living room	171	177.6
Dining room	139.6	107
Kitchen	77.3	76
Main w.c. 2nd floor	40	31 2
2nd w.c. main floor	16.5	15
Master bedroom	146	196.4
2nd bedroom	90.7	117
3rd bedroom (den)	54.6	n/a
Storage	47.5	28.5
Full basement	559	532
Upper deck	225.2	n/a
Circulation - interior stairs and space	183.8	169.3
- exterior stairs only	43.5	14.5
Total	1808.2 ft²	1508.5 ft²
Non-liveable area*	827.7 ft²	566.5
Effective net liveable area	980.5 ft²	942 ft²

(* consists of full basement, upper deck and exterior stairs)

BUILT FORM AREA BREAKDOWN

- Telephone, T.V. and electrical services are conceived to be by underground connection. The method of servicing would be carried out in a similar fashion to the water and sewer lines, however, from the opposite direction e.g. lane. Wherever possible common trenching is proposed.

The placement of utilities will require to be carried out through the use of easements as necessary.

BUILT FORM CONCEPT

Planning Perspective

The following points summarize the planning design concept as conceived for the Cluster In-fill units:

1. The plan for 8 family units on three 50'x120' residential lots retaining the single family character and feeling and unit identity within the cluster. Retaining these characteristics has been an overriding and major philosophic design goal at all levels of planning and architectural consideration.

   Unit identity and single family character and feeling is apparent as a result of the following design features:

   a) Alternating roof axis orientation and scale considerations (reflecting the character and scale of adjacent properties and land uses.

   b) Private yards: the single family house as it relates to its lot.

   c) Each unit with fireplace, centrally located.

2. To site the 8 units in such a way that the apparent density is reduced i.e. only 4 units front the street and units have alternating roof axis orientation.

3. To plan for an efficient use of open space: no space is wasted and all exterior space is useable. Side yards that are generally limited in use have been reduced to a minimum.

4. There is a hierarchy of different types of open space that relates directly to family activities and needs.

   i.e. a) Useable and readily accessible private open space for each unit.

   b) Common open space (supervisable for smaller children).

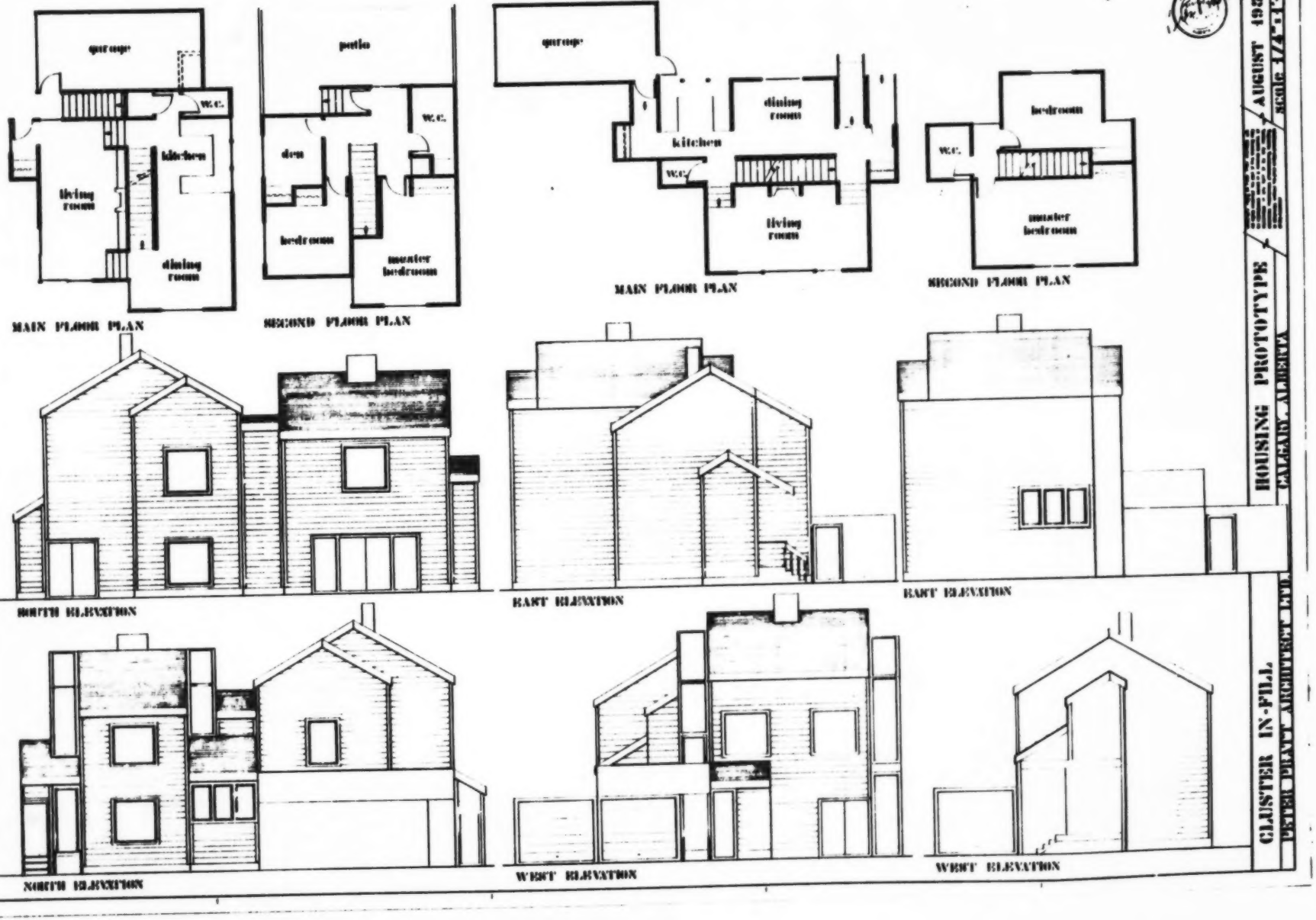
   c) Open space area for older adolescents.

Architectural Perspective

The following statements summarize the architectural design concept as conceived for the Cluster In-fill units:

1. Both the two and three bedroom units are designed to achieve the maximum floor area for the least amount of exterior surface area, thus reducing material costs and increasing potential energy savings.

   i.e. The unit plans approximate the square in plan and cube in volume as opposed to being long, narrow and rectangular in shape which is typified by the standard 25' lot unit.


garage
w.c.
kitchen
living room
dining room
MAIN FLOOR PLAN
patio
w.c.
den
bedroom
master bedroom
SECOND FLOOR PLAN
garage
dining room
kitchen
w.c.
living room
MAIN FLOOR PLAN
bedroom
w.c.
master bedroom
SECOND FLOOR PLAN
SOUTH ELEVATION
EAST ELEVATION
EAST ELEVATION
NORTH ELEVATION
WEST ELEVATION
WEST ELEVATION
CLUSTER IN-FILL
PETER PRATT ARCHITECT LTD.
HOUSING PROTOTYPE
CALGARY, ALBERTA
AUGUST 1982
SCALE 1/4"=1'-0"

2. The units are designed with a minimum interior circulation area.

   i.e. The units have no interior hallways and the central stairway allows for efficient utilization of part of the space above the stairway as either cupboard storage for at least two bedrooms or as extra bedroom space.

3. The units are designed so that the exterior spaces relate directly to the interior spaces resulting in a less confining feeling through the psychological expansion of the interior space.

   i.e. The living room is stepped down from the entry-dining-kitchen level thus achieving the following:

   a) The living room and outdoor patio are at the same level connected by two glass doors.

   b) Higher living room ceiling height.

   The second level of the three bedroom unit accesses onto a patio deck above the garage.

4. The units are connected in pairs by a common wall at the washroom location only so as to achieve back-to-back service economies.

5. The units have been planned with a potential for prefabrication; this has been achieved through the modularization of component parts with dimensions that readily lend themselves easily to transportation.

   The breakdown of each unit into component parts e.g. (i) (dining room, kitchen, w.c.) or (dining room) and (kitchen, w.c.) (ii) living room (iii) bedroom or (bedroom and den) (iv) master bedroom allows for a certain flexibility in the type of construction that will be adopted e.g. stick built; prefabricated wall sections, prefabrication of component parts or combinations of the same.

   N.B. The units are made up of two half sections joined by a central stairway. Each half section has dimensions that vary between 9' to 12' x 20' to 25'.

   Main level kitchen/washroom modules in both the two and three bedroom units have similar dimensions and could either be fabricated as modules separately or as part of the adjacent dining room module.

6. Basements have been designed with the potential for basement suite development.

   i.e. Exterior entranceway and stairs, living room, kitchenette, bedroom and washroom with shower.

7. The units have been designed with energy conservation as a criteria.

   i.e. a) Large windows in south facing walls allow the sun's rays to penetrate deep into the house during the winter (solar sink potential).

   b) Insulation and tight construction (air leaks cut to a minimum) are heat conservation measures that may reduce artificial heating needs up to 35%.

ROOF PLAN

GROUND LEVEL

8. The units have been designed with consideration for future maintenance. i.e. Exterior cladding to be narrow aluminum siding with cedar corner trim (corners usually receive the most abuse).

APPLICATION OF FINDINGS AGAINST DEVELOPMENT PLAN OPTIONS

Financial Benefits and Market Implications

To ascertain the market implications and financial benefits of selected options, a comparative consolidated cost analysis of the three major parts essential for the development process was prepared. Cost benefits comparisons were made to determine the most economical option(s) within the marketability potential in Calgary's current in-fill settings. Through this process, selection of optimum options to provide consumer acceptable and affordable in-fill housing were determinable.

Schedules I through IV clearly indicate specific costs within the three components of: land, hard costs and soft costs.

Additional land costs (other than raw land) required by the development process are manifested by the City of Calgary service hook-up regulations and charges. These are substantially higher for fee simple tenure. Consequently in-fill housing developed under these constraints lead developers to elect the condominium form of tenure instead.

To assure maximum accuracy in determining the financial benefits of selected development options, all built form features of consumer concern were required to be identical. Discrepancies in hard costs are manifest through the inherent cost differences of built form designs.

Specific soft costs remained constant for all selected options with the exception of interim financing. Interim financing is dependent upon and directly proportionate to the value of land, hard costs and construction time. (The time element is an important cost variable at all time. It is especially critical in periods of high interest rates. The average time required to attain building permit status within infill is approximately 22 weeks as opposed to suburban experience of approximately 6 weeks).

Current Status of Calgary's Housing Costs

An updated market survey was prepared to assess the current range of housing costs by type and for specific districts and zones in Calgary. The results determined the parameter of proficiency required by selected options to qualify as potential candidates capable of providing affordable and desirable in-fill shelter.

The concentration directed to Districts #50 and #51 (Sunnyside/Hillhurst and Hillhurst/Parkdale, current in-fill development districts) provided the average price of property types and form of tenure. Findings proved the condominium duplex and Cluster In-fill Concept to be the most favourable in terms of affordability and marketing criteria. (See page 20 plan).

Although not the most economical option, the merits and benefits of the Cluster In-fill Concept manifest advantages successfully addressed. The concept resolves a number of present economic, sociological and environmental housing issues. (As documented on p. 45 and p. 46, "Implications on Housing Affordability").

LEGAL IMPLICATIONS

The Cluster Concept will be based on condominium ownership: it will be a combination of fee simple ownership of the housing unit and the surrounding yard; and undivided ownership in common with other purchasers, of the common elements including garages, driveway, turnaround, tot lots and connecting path

SCHEDULE I

COMPARATIVE COST ANALYSIS OF DEVELOPMENT PLAN OPTIONS

OPTION per unit costs 3 bdrm 1100 ft²	A 3-Single Family-D	B 6-Single Family-D	C 8-Duplex S/S	D 8-Duplex S/S Condo	E 8-Duplex F/B	F 8 Cluster Condo
Land Costs	$ 101,197	$ 53,682	$ 44,011	$ 39,074	$ 44,136	$ 39,121
Hard Costs	51,870	53,220	46,200	46,200	50,600	48,400
Soft Costs	17,589	14,075	12,015	12,015	12,637	12,826
TOTAL COSTS	$ 170,606	$130,977	$102,226	$ 97,289	$107,373	$100,347
Developer's profit @ 10%	17,061	12,098	10,223	9,729	10,737	10,035
	$187,667	$133,075	$112,449	$107,018	$118,110	$110,382
Marketing commissions @ 5% (real estate fees, advertising, etc.)	9,383	6,654	5,622	5,351	5,906	5,519
TOTAL SELLING PRICE	$197,050	$139,729	$118,071	$112,369	$124,016	$115,901

D- Detached
S/S- Side by side
F/B- Front to back

All units are fee simple in tenure with the exception where condominium as noted.
Duplex and cluster are classified as semi-attached.

SCHEDULE II

LAND COST BREAKDOWN

OPTION units/type per 150'x120' lot	A 3-S.F.D.	B 6-S.F.D.	C 8 Duplex S/S	D 8 Duplex S/S Condo	E 8 Duplex F/B	F 8 Cluster Condo
1. Land	$ 270,000	$ 270,000	$ 270,000	$ 270,000	$ 270,000	$ 270,000
2. Legal/Survey	500	1,000	3,000	5,500	4,000	4,500
3. Demolition / Site Preparation	13,500	13,500	13,500	13,500	13,500	13,500
4. Service hook-up	15,000	30,000	40,000	10,000	40,000	5,000
5. On-site services	3,000	6,000	24,000	12,000	24,000	18,380
6. Taxes	1,590	1,590	1,590	1,590	1,590	1,590
TOTAL COST	$ 303,590	$ 322,090	$ 352,090	$ 312,590	$ 353,090	$ 312,970
COST PER UNIT	$ 101,197	$ 53,682	$ 44,011	$ 39,074	$ 44,136	$ 39,121

S.F.D. - Single family dwelling
S/S - Side by side
F/B - Front to back

All options are fee simple tenure with the exception of condominium ownership as stated.
Duplex and cluster are classified as semi-attached.

SCHEDULE III

BASIC CONSTRUCTION COSTS - (HARD COSTS)

OPTION per unit costs 3 bdrm 1100 ft²	A Single Family-D	B Single Family-D	C Duplex S/S	D Duplex S/S - Condo	E Duplex F/B	F Cluster - Condo
Basic contract	$ 50,600	$ 52,000	$ 46,200	$ 46,200	$ 50,600	$ 48,400
Additions: detached garage	1,270	1,220	--	--	--	--
TOTAL CONSTRUCTION COST	$ 51,870	$ 53,220	$ 46,200	$ 46,200	$ 50,600	$ 48,400
COST PER SQ. FT.	$ 47.11	$ 48.38	$ 42.00	$ 42.00	$ 46.00	$ 44.00

D - Detached
S/S - Side by side
F/B - Front to back

All options are fee simple tenure with the exception where condominium ownership as stated.
Duplex and cluster are classified as semi-attached.

SCHEDULE IV

SOFT COSTS

OPTION unit/type - cost per unit	A Single Family-D	B Single Family-D	C Duplex S/S	D Duplex S/S - Condo	E Duplex F/B	F Cluster - Condo
1. Professional fees - architecture	$ 2,539	$ 2,607	$ 2,142	$ 2,142	$ 2,346	$ 2,244
2. Landscaping	2,000	2,000	2,000	2,000	2,000	2,500
3. Permits/insurance/appraisal	700	700	700	700	700	700
4. Interim financing	9,757	6,107	4,863	4,863	5,061	4,962
5. Contingency	2,591	2,661	2,310	2,310	2,530	2,420
TOTAL COST	$ 17,589	$ 14,075	$ 12,015	$ 12,015	$ 12,637	$ 12,826

D - Detached
S/S - Side by side
F/B - Front to back

All units are fee simple tenure with the exception where condominium is stated.
Duplex and cluster are classified as semi-attached.

SCHEDULE 1A - NORTH CALGARY

CONDOMINIUM

	1982(2nd.Qt)	1982(1st.Qt)	1981	%change
Average price	$ 82,377	$ 81,405	$ 77,179	+6.7
Ratio of condominium sales	12%	15.1%	12.1%	
Districts with prime sales activity				
#64 Varsity Acres	$ 74,952	$ 78,667	$ 77,500	-3.3
#51 Parkdale/W.Hillhurst	114,366	113,500	108,500	+5.4
#50 Sunnyside/Hillhurst	111,345	104,850	105,500	+5.5

RESIDENTIAL

Average price	$ 121,686	$ 119,192	$ 119,192	+2
Districts with prime sales activity				
#60 Beddington/Sandstone	$ 109,884	$ 107,970	$ 116,000	-5.3
#67 Crowchild/Ranchlands	123,414	128,411	130,000	-5.1
#66 Silver Springs	130,414	122,275	130,000	--

SCHEDULE 1B NORTH CALGARY

COMPARATIVE ACTIVITY BY PROPERTY TYPE

	1982	1981	% change
RESIDENTIAL ATTACHED			
S/L	31		
A/P	$ 89,995	$ 79,422	+13
U/S	69	199	-65
D/S	60	39	+53
RESIDENTIAL CONDO (apt)			
S/L	21		
A/P	$ 88,363	$ 84,896	+4
U/S	29	52	-44
D/S	51	53	-3
RESIDENTIAL CONDO (thse)			
S/L	20		
A/P	$ 87,259	$ 87,426	--
U/S	89	194	-54
D/S	62	34	+82
RESIDENTIAL DETACHED			
S/L	23		
A/P	$ 123,800	$ 119,994	+3
U/S	710	1332	-47
D/S	59	36	+63
TOWNHOUSE			
S/L	22		
A/P	$ 85,904	$ 77,057	+11
U/S	24	25	-4
D/S	71	26	+173

SCHEDULE 2A - EAST CALGARY

CONDOMINIUM

	1982(2nd Qt.)	1982(1st Qt)	1981	%change
Average price	$ 72,146	$ 64,500	$ 63,400	+13
Ratio of condominium sales	12.6	13.2	12.6	
Districts with prime sales activity				
#74 Marlboro/Abbeydale	$ 63,325	$ 63,979	$ 58,500	+8.3
#71 Forestlawn/Forestheights	57,361	57,565	51,000	+12.5
#76 Rundle	59,383	59,271	53,000	+12.0

RESIDENTIAL

Average price	$ 89,902	88,800	87,200	+3.0
Districts with prime sales activity				
#79 Temple	$ 100,000	$ 102,030	$ 108,000	-7.4
#78 Whitehorn	102,831	104,422	95,100	+8.1
#74 Marlboro/Abbeydale	86,859	85,564	87,000	--

SCHEDULE 2B EAST CALGARY

COMPARATIVE ACTIVITY BY PROPERTY TYPE

	1982	1981	% change
RESIDENTIAL ATTACHED			
S/L	32		
A/P	$ 73,714	$ 68,097	+8
U/S	145	375	-61
D/S	55	43	+27
RESIDENTIAL CONDO (apt)			
S/L	28		
A/P	$ 69,851	$ 92,753	-24
U/S	32	28	+14
D/S	86	56	+53
RESIDENTIAL CONDO (thse)			
S/L	28		
A/P	$ 62,620	$ 58,707	+6
U/S	120	232	-48
D/S	48	36	+33
RESIDENTIAL DETACHED			
S/L	24		
A/P	$ 95,327	$ 89,295	+6.8
U/S	750	1527	-51
D/S	54	42	+28.6
TOWNHOUSE			
S/L	31		
A/P	$ 60,642	$56,520	+7
U/S	23	58	-56
D/S	50	30	+66

SCHEDULE 3A - SOUTH CALGARY

CONDOMINIUM

	1982(2nd Qt)	1982(1st Qt)	1981	%change
Average price	$ 88,228	$ 90,639	$ 74,882	+17.8
Ratio of condominium sales	12.6	14.2	12.8	
Districts with prime sales activity				
#25 Oakridge/Palliser	$ 76,220	$ 74,009	$ 76,000	—
#02 Beltline/Sunalta/Victoria Pk.	87,164	93,019	80,000	+9
#26 Braeside	77,354	86,780	72,000	+7.4
Residential				
Average price	$ 138,635	134,522	133,177	+4.1
Districts with prime sales activity				
#28 Woodlands	$ 138,056	$ 132,780	$ 138,000	—
#47 DearRun/Deer Ridge	137,132	137,261	117,000	+17
#43 Bonnenture/Bonavista	173,919	170,000	150,000	+16

SCHEDULE 3B SOUTH CALGARY

COMPARATIVE ACTIVITY BY PROPERTY TYPE

	1982	1981	% change
RESIDENTIAL ATTACHED			
S/L	27		
A/P	$ 88,173	$ 82,181	+7
U/S	80	198	-59
D/S	50	40	+25
RESIDENTIAL CONDO (apt)			
S/L	14		
A/P	$ 84,952	$ 76.212	+11
U/S	72	115	-37
D/S	73	46	+58
RESIDENTIAL CONDO (thse)			
S/L	23		
A/P	$ 86,087	$ 84,323	+2
U/S	143	269	-46
D/S	61	40	+52
RESIDENTIAL DETACHED			
S/L	21		
A/P	$ 137,035	$ 141,759	-3
U/S	1143	2336	-51
D/S	58	40	+45
TOWNHOUSE			
S/L	13		
A/P	$ 92,842	$ 80,675	+15
U/S	7	14	-50
D/S	43	22	+95

Residential attached - duplex or fourplex with fee simple tenure.
Townhouse - row housing with fee simple tenure.

S/L - sales to listing ratio
A/P - average price
U/S - units sold
D/S - days to sell

consisting of land and its appurtenances. As in usual instances, the owners have the choice of: owning their unit(s) free and clear of any mortgages; or financing their unit(s) through conventional mortgage channels according to their own changing economic conditions. The owners would enjoy the advantages similar to single family detached house ownership and may will or give away the property. Each deed would be recorded separately and their taxes levied individually.

The condominium common area management will require to be controlled by a residents' association with 2/3 voting rule. Common responsibilities of looking after those common ownership areas would be shared by the unit owners where each owner will be responsible for the care and maintenance of their own unit and surrounding private yards. Costs for common area maintenance would be assessed as monthly charges to the individual owners. The common obligation is part of each deed. Each owner will be charged according to the value of his property in relation to the entire condominium. This value cannot change, nor can the maintenance liability, without agreement of all the owners.

To maintain certain architectural controls over paint colour, fencing, additions etc. it is intended to have the builder/developer establish from the outset, a set of architectural guidelines that would be written into the deed as a restrictive covenant. The architectural guidelines otherwise may be adopted by the condominium association and written into their by-laws so that each successive new owner who buys into the cluster will be made aware of conditional requirements.

Certain caveats and easements will have to be registered against the titles in order to protect the individual owner(s) right to maintain his/her home and to preserve the architectural aspect of the streetscape. This will call for an additional plan to be registered in order to protect the maintenance easements.

SUMMARY OF NET BENEFITS OF THE CLUSTER IN-FILL DESIGN

The merits and benefits of the Cluster In-fill Concept may be evaluated upon its manifest advantages that are successfully addressed. The concept resolves a number of present economic, sociological and environmental housing issues.

Cost Benefits

The cluster concept capitalizes on cost benefits generally available only through duplex and row housing. The concept has consequent cost advantages and its selling price enhances this competitive product in the current infill market. The cluster concept appears to penetrate the affordability threshold in the infill context and creates a previously untouched market demand. It satisfies many of the existing housing needs and new market desires.

Implications on Housing Affordability

The coalition of innovative site plan and superior built form design retains the single family character and feeling while reducing apparent density. Inefficient and costly circulation space is minimized while providing a more efficient and pleasing relationship of the interior to the hierarchy of different types of open space. The layout and landscape design gives the area its desired singular ownership character with low maintenance of common areas. Effective integration of common useable space provides more efficient recreational areas and safer flow of pedestrian circulation. The cluster protects

family, maximizes the life style through small neighbourhood enclaves and supports diversity and range of life style (family and individual mix). This "neighbourhood within a neighbourhood" promotes communal feeling and common awareness in all communities. Family security is enhanced by virtue of design and provides small, peaceful places free from vehicular traffic.

It is the presence of these intangible benefits which promote the cluster concept into a superior and distinguished category of housing. Since the cost and selling concerns are comparable or superior to selected options and within market dictates, the value attached to inherent amenities will be determined by the "family oriented" and other market peoples.

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POOR

QUALITY

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